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PHYSICAL AND CHEMICAL DATA, RISEPAC EXPEDITION, 7-23 DECEMBER 1--ETC(U)
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PHYSICAL AND CHEMICAL DATA

RISEPAC Expedition,
7-23 December 1961

PROA Expedition,
12 April - 6 July 1962

and

ZEPHYRUS Expedition
12 July - 26 September 1962

(14)

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UNIVERSITY OF CALIFORNIA

SCRIPPS INSTITUTION OF OCEANOGRAPHY

PHYSICAL AND CHEMICAL DATA

RISEPAC Expedition
7-23 December 1961

Sponsored by
National Science Foundation and
the Office of Naval Research

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12 April - 6 July 1962

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SIO Reference 66-16

Approved for distribution:

W. A. Nierenberg

W. A. Nierenberg, Director

CONTENTS

INTRODUCTION

RISEPAC EXPEDITION

RISEPAC data were collected from October 1961 to February 1962 by the RV Spencer F. Baird of the Scripps Institution of Oceanography. The expedition was funded under contracts with the Office of Naval Research and the National Science Foundation. The primary purpose of the RISEPAC Expedition was to investigate in greater detail than had been previously attempted the distribution and variation of heat flow through the Pacific floor. Results of the heat-flow measurements have been published and discussed in detail in Von Herzen and Uyeda (1963) in a general study of the eastern Pacific. A considerable amount of magnetic survey work was carried out also and it is discussed in part in Raff (1962).

Publications using data from the RISEPAC Expedition include:

CRAIG, HARMON, and LOUIS I. GORDON

1965 Deuterium and oxygen 18 variations in the ocean and the marine atmosphere. Stable Isotopes in Oceanographic Studies and Paleo-temperatures. Proceedings of the Third Spoleto Conference, Spoleto, Italy, 1965, ed. E. Tongiorgi, pp. 9-130

1965 Isotopic Oceanography. In Symposium on Marine Geochemistry, (University of Rhode Island, 1964) Narragansett Marine Laboratory Occasional Publication 3-1965, pp. 277-374

RAFF, ARTHUR D.

1962 A time saving method for determining the characteristic shape and strike of oceanic magnetic anomalies. Univ. Calif. San Diego Marine Physical Laboratory Technical Memorandum 127

VON HERZEN, R. P., and S. UYEDA

1963 Heat flow through the Eastern Pacific Ocean floor. J. Geophys. Res. 68(14): 4219-4250

PROA EXPEDITION

PROA data were collected from March through September 1962 by the RV Spencer F. Baird of the Scripps Institution of Oceanography. The expedition, funded by the National Science Foundation, was a geological-geophysical cruise to the Western and Central Equatorial Pacific. The aims of this expedition were set forth as follows in the preliminary cruise announcement:

"Studies primarily topographic and geophysical (Guam-Suva)

"Beginning at the east end of the Challenger Deep, topographic exploration, with precision echo-sounding and bottom sampling, will be carried out within and bordering each of the three small deep trenches that extend, as a festoon, 1000 miles to the southwest. These trenches, lying close to narrow ridges bearing small coralline islands, are strongly curved and intersect each other at sharp angles. Bathymetric exploration at the near points of intersection will better establish their structural and perhaps age relations. At present little is known of possible continuations of the arcuate trends beyond intersections. Precise sounding should reveal the depth and character of the trench floors, give evidence of the amount of sedimentary fill or ponding at sills and the roughness and texture of the deeper portions of the trench walls. Well located samples of wall rock and trench floor deposits have been extremely difficult to obtain; newly developed sounding and sampling equipment will reduce this difficulty. Dredging samples of probable outcrops of sediments or volcanic rocks on the deep slopes will help date the trenches, giving direct information on their mode and rate of development. Long cores of trench floor sediments will help establish rates and processes of sedimentation. Measurements of the flow of heat from crust and mantle through the sea floor will be made in, adjacent to, and well outside the trenches. These will indicate if the pattern of low flow established for the Eastern Pacific trenches, probably related to the formation and maintenance of those near-continent features, is characteristic also of the small but very active deep trenches bordering island arcs far from large land areas and abundant sources of sediment.

"Topographic, sampling and heat-flow investigations would be made in the Bougainville-North New Hebrides trench system,* which differs from all other trench occurrences in that it fronts on a shoal area of complex relief rather than on an ocean basin. Although similar in seismicity and in gravity anomalies to other trenches, it lies on the 'wrong' side of the andesite line. Previous structural studies suggest that large-scale transcurrent faulting is developed in the Melanesian region. The abrupt changes in trend and the sudden differences in depth along these trenches may be related to this faulting. Careful bathymetric exploration of their intersections will help establish the scale and direction of movement. A similar investigation of the perhaps related series of deeps just north of the New Guinea-Melanesian border will be carried out.

"Studies primarily stratigraphic and secondarily topographic (Suva-Honolulu)

"Legs IV-VI of the proposed expedition are designed to investigate regions in

* Now called New Britain-New Hebrides trench system.

which widely spaced cores collected by earlier cruises show especially interesting Tertiary-Quaternary stratigraphy. Whereas previous geological cruises through this part of the Pacific have sampled infrequently along straight 'surveying' tracks, it is now proposed to investigate in some detail the stratigraphy (and associated small-scale topography) of specific areas showing promise of significant results. The overall objective is to obtain samples of as many pre-Quaternary ages as possible, both north and south of the Equator, by avoiding areas of rapidly accumulating young calcareous sediments. Thus long periods of time will be represented in the cores obtained, and it is expected that approximate age assignments based on siliceous microfossils will be possible on board ship, to assist in developing the field program. Study of the cores in relation to the small-scale topography and bottom photographs is expected to shed light on some aspects of the mechanics of deep-sea sedimentation (reworking of older material into younger, reasons for unconformities in the sequences, etc.). In addition, as a long-term goal, it is hoped that detailed comparison of isochronous Tertiary microfossil assemblages on both sides of the present equatorial current system will give some indication of the nature and boundaries of that system during the Tertiary.

"On Scripps Institution's CAPRICORN Expedition, reworked Mesozoic microfossils were found in sediments, apparently emplaced by turbidity currents, at the base of a slope north-northwest of Fiji. On Leg IV an attempt will be made to locate the source of this reworked material. The remainder of Leg IV, and Legs V and VI, will investigate in detail areas in which middle to late Tertiary sediments were cored at a few widely separated localities by the Swedish Deep-Sea Expedition and Scripps Institution's MONSOON Expedition."

Itinerary of PROA Expedition

March 15, 1962	Departed San Diego
April 4-10	At Guam
May 7-10	At Rabaul, New Britain
June 2-4	At Noumea, New Caledonia
June 10-13	At Suva, Fiji
June 26	Funafuti, Ellice Islands
July 1	Onatoa, Gilbert Islands
July 8-12	Kwajalein, Marshall Islands
July 31	Pago Pago, Samoa
August 1-6	Apia, Western Samoa
August 31	Arrived Honolulu

Analysis of the geological-geophysical data will continue for several years. Incidental references to some of the results have been made in several publications by Fisher,

Riedel, and Craig, or presented at symposia by Suess, Craig or Folsom. Published papers that incorporate PROA data include:

CRAIG, HARMON, and LOUIS I. GORDON

1965 Deuterium and oxygen 18 variations in the ocean and the marine atmosphere. Stable Isotopes in Oceanographic Studies and Paleo-temperatures. Proceedings of the Third Spoleto Conference, Spoleto, Italy, 1965, ed. E. Tongiorgi, pp. 9-130

1965 Isotopic Oceanography. In Symposium on Marine Geochemistry, (University of Rhode Island, 1964) Narragansett Marine Laboratory Occasional Publication 3-1065, pp. 277-374

FISHER, ROBERT L.

1962 Pacific Ocean. In McGraw-Hill Yearbook of Science and Technology, McGraw-Hill Book Co., Inc., New York, pp. 384-390

FISHER, ROBERT L., and HARRY HESS

1963 Trenches. Chapter 17 in The Sea, Volume III, edited by M. N. Hill. Interscience Publishers, New York, pp. 411-436

RIEDEL, WILLIAM R., and BRIAN M. FUNNELL

1964 Tertiary sediment cores and microfossils from the Pacific Ocean floor. Quart. Jour. Geol. Soc. London 120, pp. 305-368

ZEPHYRUS EXPEDITION

ZEPHYRUS Expedition data were collected from June to August 1962 by the RV Horizon of the Scripps Institution of Oceanography. The expedition was funded under contracts with the Office of Naval Research and the National Science Foundation. It was primarily a geochemical and geophysical investigation of the Atlantic Ocean, Mediterranean Sea and Red Sea by the Horizon en route to India to join the RV Argo for Expedition LUSIAD.

Harmon Craig has studied the hydrogen and oxygen isotopic compositions of water vapors and sea waters in the Atlantic Ocean, Mediterranean Sea and Red Sea. Surface waters were never found to be in isotopic equilibrium with the overlying water vapor. The deviations from equilibrium are quite high and similar to those observed in the Pacific. Across a latitudinal profile in the Atlantic, the deviations were nearly constant in accord with the observation that the large variations in the Pacific occur in a north-south profile. These results can be correlated with the molecular exchange flux across the water-atmosphere interface. The relative amount of deviation from equilibrium varies with the differences between the saturation vapor pressure and the observed vapor pressure of water. Isotopic studies on the deep waters of the North Atlantic confirmed the classical oceanographic concept that these deep waters result from the sinking of Arctic water masses.

H. W. Menard made extensive studies on the Rhone Deep-Sea Fan and his results were published in a Special Volume from the Colston Symposium in Bristol, England, held in April 1965. His primary findings were an extraordinary network of leveed channels at the head of the fan and detailed internal structures of these channels from Precision Depth Recorder records.

T. H. van Andel is studying the minerals from the Adriatic sediments at the present time with Bruno Pigorini at the Scripps Institution of Oceanography. Heat-flow measurements were made across the Mid-Atlantic Ridge by two Earth Science Department students, W. K. Lee and R. Nason; high values were found on the flanks of the ridge. Results were published as " Preliminary heat-flow profile across the Atlantic." R. D. Nason and W. H. K. Lee. Nature, 196, 975 (1962).

E. D. Goldberg and associates measured by the ionium/thorium technique the rates of sedimentation in a series of cores collected between Martinique and Gibraltar. Lowest rates (on a calcium carbonate free basis) were found in the valleys of the Mid-Atlantic Ridge, where values of less and 1 mm/10^3 years were found. In the open ocean region to the east and west of the ridge the rates were of the order of millimeters/10^3 years. Evidence for major changes in rates of sedimentation in the ridge valley cores were observed at depths corresponding to deposition 90, 000 and 130, 000 years ago.

Mineral analysis of the cores indicated that only a very small fraction of the sediment found on the ridge is derived from the ridge itself; the major portion of the deposit is of continental origin.

Publications using data from the ZEPHYRUS Expedition include:

CRAIG, HARMON, and LOUIS I. GORDON

1965 Deuterium and oxygen 18 variations in the ocean and the marine atmosphere. Stable Isotopes in Oceanographic Studies and Paleo-temperatures. Proceedings of the Third Spoleto Conference, Spoleto, Italy, 1965, ed. E. Tongiorgi, pp. 9-130

1965 Isotopic Oceanography. In Symposium on Marine Geochemistry, (University of Rhode Island, 1964) Narragansett Marine Laboratory Occasional Publication 3-1965, pp. 277-374

GOLDBERG, EDWARD D., and JOHN J. GRIFFIN

1964 Sedimentation rates and minerology in the South Atlantic. Journal of Geophysical Research 69(20): 4293-4309

GOLDBERG, EDWARD D., MINORU KOIDE, JOHN J. GRIFFIN, and M. N. A. PETERSON
1963 A geochronological and sedimentary profile across the north Atlantic Ocean. In Isotopic and Cosmic Chemistry, edited by H. Craig, S. L. Miller and G. J. Wasserburg. Amsterdam, North Holland Publishing Co., 1963. pp. 211-232

STANDARD PROCEDURES

The data are tabulated at observed depths; the interpolated and computed values are tabulated at standard depths. The presentation of data in this report does not constitute publication; the data contained in this report, however, have been carefully edited and no modifications should be necessary before final publication.

Processing of the data was carried out using the method described by Klein.[1] The 125-meter level was introduced into the integration to obtain greater accuracy in the determination of ΔD.

To indicate the degree of accuracy, temperatures are recorded in tenths of a degree when obtained by bucket thermometer, thermograph, or bathythermograph, while temperatures from reversing thermometers are recorded in hundredths of a degree. The salinity values obtained by salinometer are recorded to three decimal places, provided they meet accepted standards. The values recorded "have a reproducibility of ±0.004‰ salinity at the 95 per cent probability level, and a probable accuracy of ±0.01‰ salinity or better at the same level of probability."[2] The values are recorded to two decimal places when obtained by chlorinity titration, or by salinometer where only one determination per sample was obtained, or where there is doubt concerning the accuracy of a particular sample, or of all samples on a station. The accuracy of all samples obtained by salinometer and recorded to two decimal places is believed to be equal to or better than those obtained by manual titration.

Extrapolated values and values interpolated between remote observations are entered within parentheses. A hyphen is used to indicate a missing observed value. The time is the time of messenger release. When more than one cast was made on a station, messenger times and wire angles are given in the order of increasing depth. A line is left blank between the observed data of each cast.

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[1] Klein, Hans T. A new technique for processing physical oceanographic data. MS.
[2] Quotation from Department of Oceanography, University of Washington, Tech. Rep. No. 66, UW Ref. 60-18, October 1960

On stations where more than one cast is lowered, the various property curves may not agree perfectly. This discrepancy may be caused by changes in geographical position, real property changes with time, slight error in measurement, or a combination of these factors. Stations with overlapping casts have the following footnote: Overlapping casts; reconciliation of property curves when necessary.

FOOTNOTES

Laboratory personnel note any possible imperfections in the sealing of the bottles as follows:

Loose bottle cap:	The cap is definitely loose so that it could be moved with very little applied pressure. The salinity values obtained from these samples may be usable depending on time and/or conditions of storage.
Possible evaporation:	Either the cap was sealed with less than usual pressure, the bottle edge chipped, the rubber washer cracked, or the bale broke on opening, etc.

Use of the above values in interpolation depends upon consistency with other values of salinity and other properties, and these footnotes are supplemented with "falls on property curve" or "does not fall on property curve," depending upon whether the property curve was drawn through the value or not.

In addition to footnotes, a special notation is used without a footnote because its meaning is always the same.

Values which are not drawn through because they seem to be in error without apparent reason are indicated by the following notation.

u: uncertain value (value may be correct; occasionally it can influence the drawing of the property curve).

FORMAT

These data were collected in part by personnel of and processed completely by the Data Collection and Processing Group (DCPG), Scripps Institution of Oceanography. They are presented in the format of the University of California Press publication, <u>Oceanic Observations of the Pacific</u>.

FIGURES
RISEPAC Expedition

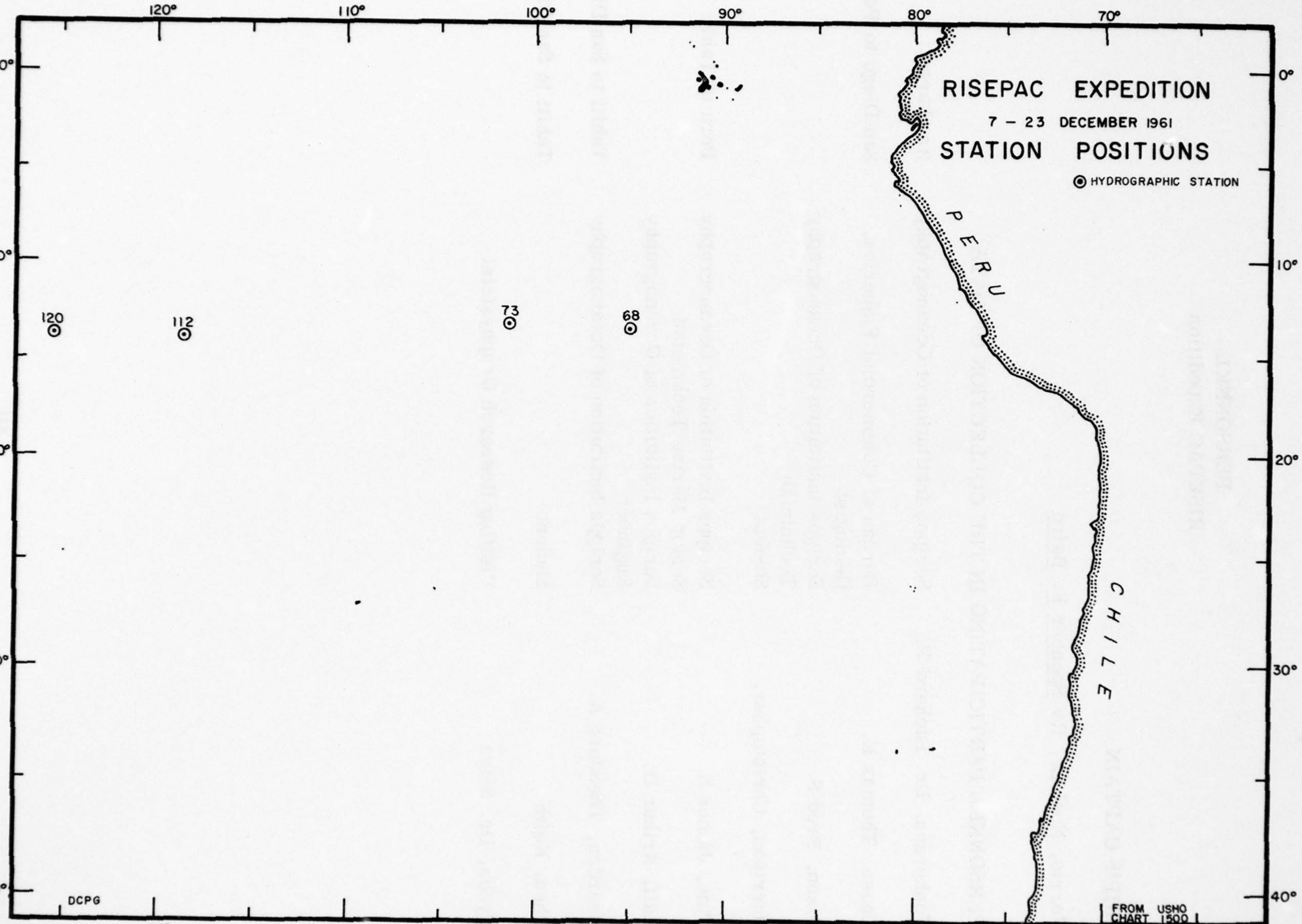

RISEPAC EXPEDITION
7 – 23 DECEMBER 1961
STATION POSITIONS
HYDROGRAPHIC STATION
PERU
CHILE
120
112
73
68
120°
110°
100°
90°
80°
70°
0°
10°
20°
30°
40°
DCPG
FROM USHO
CHART 1500

FIGURE I

PERSONNEL
RISEPAC Expedition

SHIP'S CAPTAIN

Ferris, Noel L., RV Spencer F. Baird

PERSONNEL PARTICIPATING IN THE COLLECTION OF DATA

Vonherzen, Dr. Richard P.	Scripps Institution of Oceanography	(in charge)
Chase, Thomas E.	Bureau of Commercial Fisheries, Geologist	San Diego to Peru
Dixon, Fred S.	Scripps Institution of Oceanography Technician	
Harrison, Christopher,	Student	
Pine, James S.	Scripps Institution of Oceanography Senior Marine Technician	Peru to Tahiti
Raff, Arthur D.	Scripps Institution of Oceanography Engineer	
Rearden, Theodore A.	Scripps Institution of Oceanography	Tahiti to San Diego
Rhea, Keith	Student	Tahiti to San Diego
Uyeda, Dr. Seiya	Visiting Research Geophysicist	

OBSERVED				COMPUTED	INTERPOLATED				COMPUTED		
Z m	T °C	S ‰	O_2 ml/L	δ_T cl/ton	Z m	T °C	S ‰	O_2 ml/L	σ_t g/L	δ_T cl/ton	ΔD dyn m

HORIZON; December 7, 1961; 0058 GCT; 13°37'S, 94°57.5'W; sounding, 1980 fm; wind, 120°, force 5; weather, partly cloudy; sea, rough; wire angle, 11°. 68

55	19.94	35.623	4.26	271							
150	17.88	35.331	3.64	242							
247	11.56	34.716	-	157	250	11.46	34.72		26.49	155	0.00c)
341	9.72	34.71 a)	-	126	300	10.42	34.72		26.68	137	0.07c)
437	8.22	34.639	0.14b)	109	400	8.71	34.67		26.93	114	0.20c)
533	7.26	34.581	0.13	100	500	7.55	34.60	0.13	27.05	102	0.32c)
725	5.66	34.530	0.21	83	600	6.62	34.55	0.14	27.14	94	0.43c)
916	4.64	34.540	0.50	71	700	5.82	34.53	0.18	27.23	85	0.53c)
1106	3.91	34.562	0.85	62	800	5.21	34.53	0.30	27.30	78	0.62c)
1299	3.33	34.585	1.16	55	1000	4.28	34.55	0.66	27.42	67	0.78c)
1493	2.92	34.615	1.23	49	1200	3.60	34.57	1.02	27.51	59	0.93c)
1687	2.56	34.633	1.63	45	1500	2.90	34.61	1.24	27.60	49	1.12c)
1881	2.35	34.646	1.90	42	2000	2.24	34.65	2.05	27.69	41	1.39c)
2077	2.18	34.656	2.21	40	2500	1.86	34.68	2.89	27.75	36	1.63c)
2272	1.98	34.672	2.61	37	3000	1.79	34.69	2.94	27.76	35	1.86c)
2663	1.81	34.681	2.99	35							
2859	1.80	34.688	2.94	35							
3055	1.79	34.688	2.94	35							
3249	1.80	34.691	3.00	35							
3446	1.82	34.696	2.96	34							
3641	1.84	34.687	2.93	35							

HORIZON; December 9, 1961; 0642 GCT; 13°16.5'S, 101°24'W; sounding, 2295 fm;[d] wind, 100°, force 5; weather, cloudy; sea, very rough; wire angle, 07°. 73

46	22.16	35.620	4.42	329							
141	19.02	35.528	3.67	255							
228	12.64	34.743	0.27	175							
420	9.12	34.630	0.41	123	500	8.68	34.59	0.42	26.87	119	0.00f)
613	8.13	34.533	0.44	115	600	8.20	34.54	0.43	26.90	116	0.13f)
790	6.12	34.544e)	0.65	88	700	7.19	34.54	0.52	27.05	102	0.25f)
986	4.36	34.545	1.06	68	800	6.00	34.54	0.67	27.21	87	0.35f)
1183	3.70	34.566	1.49	60	1000	4.27	34.55	1.11	27.42	67	0.53f)
1381	3.22	34.609	1.62	52	1200	3.66	34.57	1.50	27.50	59	0.67f)
1578	2.84	34.614	1.81	49	1500	2.97	34.61	1.74	27.60	50	0.87f)
1775	2.54	34.630	2.04	45	2000	2.24	34.65	2.42	27.69	41	1.14f)
1953	2.30	34.644	2.33	42	2500	1.86	34.68	3.10	27.75	36	1.39f)
2149	2.06	34.662	2.77	39	3000	1.83	34.70	3.01	27.77	34	1.62f)
2347	1.88	34.677	3.10	36	4000	1.84	34.69	2.74	27.76	35	2.09f)
2790	1.80	34.691	3.08	35							
3034	1.84	34.707	3.01	34							
3278	1.78	34.697	2.97	34							
3523	1.80	34.686	2.90	35							
3763	1.82	34.685	2.82	35							
4014	1.84	34.687	2.74	35							

a) Alternate value, 34.94‰, not used in interpolation.
b) Alternate value, 0.04 ml/L, not used in interpolation.
c) No density values available above 250 meters. The tabulated geopotential anomaly is at 250 decibars with respect to Z.
d) Depth of cast decreased three times after the messenger was released due to drifting into shallower water.
e) Possible evaporation; value falls on property curve.
f) No density values available above 500 meters. The tabulated geopotential anomaly is at 500 decibars with respect to Z.

SIO RISEPAC

OBSERVED				COMPUTED	INTERPOLATED				COMPUTED		
Z m	T °C	S ‰	O_2 ml/L	δ_T cl/ton	Z m	T °C	S ‰	O_2 ml/L	σ_t g/L	δ_T cl/ton	ΔD dyn m

112 HORIZON; December 19, 1961; 0020 GCT; 13°59'S, 118°33'W; sounding, 1700 fm; wind, 120°, force 4; weather, cloudy; sea, rough; wire angle, 07°.

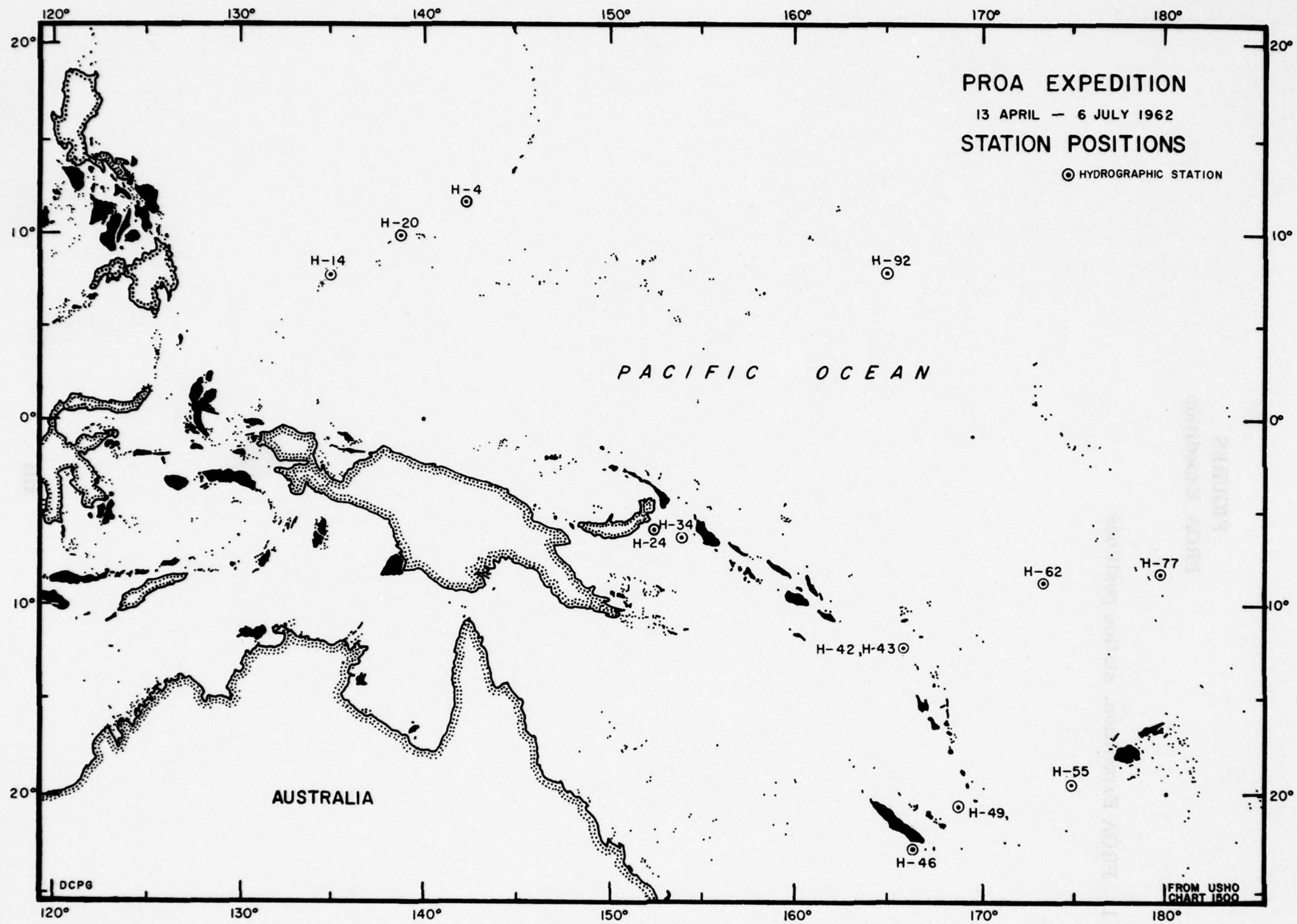
Z	T	S	O_2	δ_T	Z	T	S	O_2	σ_t	δ_T	ΔD
48	24.02	35.864	4.50	362	0	24.6	(35.86)		(24.13)	(379)	(0.00)
96	23.23	35.192	4.02	317	10	(24.50)	(35.86)		(24.16)	(376)	(0.04)
144	22.15	36.091	3.66	294	20	(24.40)	(35.86)		(24.19)	(374)	(0.08)
193	20.34	35.744	3.24	272	30	(24.30)	(35.86)		(24.22)	(371)	(0.11)
241	17.70	35.307	2.80	240	50	23.99	35.88	4.49	24.33	360	(0.19)
339	11.08	34.603	0.75	157	75	23.59	36.12	4.23	24.63	332	(0.27)
434	8.63	34.639	0.55	115	100	23.15	36.19	3.99	24.81	315	(0.35)
628	6.64	34.561	0.94	93	125	22.62	36.15	3.80	24.93	303	(0.43)
821	5.32	34.526	1.14	80	150	21.98	36.06	3.60	25.05	292	(0.51)
1015	4.36	34.535	1.35	69	200	20.00	35.68	3.18	25.30	268	(0.65)
1211	3.62	34.559	1.86	60	250	17.09	35.22	2.67	25.68	232	(0.78)
1405	3.11	34.580	2.12	53	300	13.38	34.78	1.45	26.16	186	(0.89)
1600	2.74	34.606	2.20	48	400	9.25	34.63	0.56	26.81	125	(1.05)
1796	2.40	34.628	2.46	44	500	7.82	34.62	0.70	27.02	105	(1.18)
1991	2.11	34.646	2.82	40	600	6.87	34.58	0.89	27.13	95	(1.28)
					700	6.09	34.54	1.03	27.20	88	(1.39)
					800	5.43	34.53	1.12	27.27	81	(1.48)
					1000	4.42	34.53	1.30	27.39	70	(1.65)
					1200	3.65	34.56	1.82	27.49	60	(1.80)
					1500	2.92	34.60	2.16	27.60	50	(1.99)
					2000	(2.10)	(34.65)	(2.82)	(27.71)	(40)	(2.27)

120 HORIZON; December 23, 1961; 1733 GCT; 13°54'S, 125°21'W; sounding, 2020 fm; wind, 090°, force 4; weather, cloudy; sea, rough; wire angle, 08°.

Z	T	S	O_2	δ_T	Z	T	S	O_2	σ_t	δ_T	ΔD
49	25.34	36.105	3.91	383							
99	24.21	36.327	3.65	334							
198	20.46	35.778	3.41	273							
392	11.5 a)	34.649	1.15b)	161							
587	8.47	34.572	0.87	117	600	8.23	34.56	0.88	26.91	115	0.00c)
779	5.88	34.524	1.29	86	700	6.72	34.53	1.11	27.11	96	0.12c)
974	4.70	34.533	1.50	72	800	5.73	34.53	1.31	27.24	84	0.22c)
1167	3.82	34.550	1.67	62	1000	4.57	34.53	1.52	27.37	71	0.40c)
1359	3.27	34.576	1.99	55	1200	3.71	34.56	1.70	27.49	60	0.55c)
1553	2.78	34.599	2.51	49	1500	2.88	34.59	2.36	27.59	51	0.74c)
1744	2.44	34.620	2.75d)	45	2000	2.11	34.65	2.87	27.70	40	1.02c)
1937	2.19	34.639	2.82	41	2500	1.87	34.67	3.10	27.74	37	1.26c)
2130	1.98	34.666	2.98	38	3000	1.71	34.68	3.40	27.76	35	1.49c)
2323	1.90	34.669	3.06	37							
2517	1.86	34.674	3.15	36							
2712	1.80	34.677	3.22	36							
2908	1.75	34.681	3.30	35							
3102	1.68	34.681	3.41	34							
3298	1.63	34.700	3.47	33							
3496	1.58	34.701	3.48	32							
3694	1.61	34.699	3.49	33							

a) Temperature inferred from pressure thermometer and wire depth.
b) Alternate value, 1.48 ml/L, not used in interpolation.
c) No density values available above 600 meters. The tabulated geopotential anomaly is at 600 decibars with respect to Z.
d) Alternate value, 2.56 ml/L, not used in interpolation.

FIGURES
PROA Expedition


PROA EXPEDITION
13 APRIL — 6 JULY 1962
STATION POSITIONS
HYDROGRAPHIC STATION
PACIFIC OCEAN
AUSTRALIA
H-4
H-14
H-20
H-92
H-34
H-24
H-42, H-43
H-46
H-49
H-55
H-62
H-77
120°
130°
140°
150°
160°
170°
180°
20°
10°
0°
10°
20°
DCPG
FROM USHO CHART 1500
FIGURE 1

PERSONNEL
PROA Expedition

SHIP'S CAPTAIN

Ferris, Noel L., RV <u>Spencer</u> <u>F</u>. <u>Baird</u>

PERSONNEL PARTICIPATING IN THE COLLECTION OF DATA

Bottom, Kenneth S.	Scripps Institution of Oceanography Senior Marine Technician	Guam to Kwajalein
Briggs, William	Scripps Institution of Oceanography Laboratory Technician	Funafuti to Honolulu
Fisher, Dr. Robert L.	Scripps Institution of Oceanography	San Diego to Funafuti (in charge)
Hodnett, Haley L.	Scripps Institution of Oceanography Marine Technician	Kwajalein to Honolulu
Hohnhaus, George W.	Scripps Institution of Oceanography Senior Marine Technician	Guam to Funafuti
Holzapfel, Eugene	Entomologist	San Diego to Honolulu
Luyendyk, Bruce P.	Scripps Institution of Oceanography Laboratory Assistant	San Diego to Honolulu
MacDonald, Keith B.	Scripps Institution of Oceanography Junior Oceanographer	Funafuti to Honolulu
Mack, William J.	Scripps Institution of Oceanography Marine Technician	Guam to Kwajalein
Magnier, Yves	Institut Francais d' Oceanic	Noumea to Suva
Rambo, Charles E.	Scripps Institution of Oceanography Oceanographer	Funafuti to Kwajalein
Revelle, William R.	Scripps Institution of Oceanography Laboratory Technician	Funafuti to Honolulu
Rhea, Keith P.	Scripps Institution of Oceanography Graduate Research Geologist	San Diego to Honolulu
Riedel, Dr. William R.	Scripps Institution of Oceanography	Funafuti to Honolulu (in charge)
Wang, Dr. C.	National Taiwan University	Rabaul to Suva
Wooding, Frank B.	Scripps Institution of Oceanography Senior Photographer	Guam to Apia

SIO PROA

OBSERVED				COMPUTED	INTERPOLATED				COMPUTED		
Z m	T °C	S ‰	O_2 ml/L	δ_T cl/ton	Z m	T °C	S ‰	O_2 ml/L	σ_t g/L	δ_T cl/ton	ΔD dyn m

SPENCER F. BAIRD; April 13, 1962; 0209 GCT; 11°23'N, 142°19.5'E;[a)] sounding, 5276 fm; wind, 080°, force 4; weather, cloudy; sea, rough; wire angle, 17°. H-4

Z m	T °C	S ‰	O_2 ml/L	δ_T cl/ton	Z m	T °C	S ‰	O_2 ml/L	σ_t g/L	δ_T cl/ton	ΔD dyn m
0	28.19	34.33	4.15	597	0	28.19	34.33	4.15	21.85	597	0.00
10	28.14	34.33	4.13	596	10	28.14	34.33	4.13	21.87	596	0.06
24	28.08	34.32	4.08	595	20	28.10	34.32	4.10	21.87	595	0.12
49	28.01	34.327	4.14	592	30	28.06	34.32	4.10	21.89	594	0.18
77	27.58	34.340	4.17	578	50	28.00	34.33	4.14	21.91	591	0.30
101	27.32	34.429	4.19	563	75	27.61	34.34	4.17	22.05	579	0.44
125	25.88	34.802	4.08	493	100	27.33	34.42	4.19	22.20	564	0.59
146	22.64	34.900	3.86	394	125	25.88	34.80	4.08	22.94	493	0.72
170	19.89	35.011	3.76	314	150	21.93	34.92	3.81	24.20	373	0.83
198	17.52	34.832	3.94	270	200	17.30	34.82	3.94	25.32	266	0.99
224	15.06	34.649b)	3.85	229	250	13.20	34.47	3.35	25.96	205	1.11
255	12.88	34.452	3.18	200	300	10.90	34.49	1.74	26.42	162	1.21
287	11.38	34.490	1.97	170	400	8.81	34.51	1.55	26.78	127	1.36
340	9.92	34.499	1.56	145	500	7.23	34.49	1.67	27.01	106	1.49
380	9.18	34.514	1.54	132	600	6.48	34.49	1.84	27.11	96	1.60
474	7.52	34.491	1.61	110	700	5.92	34.52	1.83	27.21	87	1.70
565	6.70	34.481	1.80	100	800	5.41	34.54	1.67	27.28	80	1.79
663	6.12	34.514	1.86	90	1000	4.56	34.56	1.60	27.40	69	1.96
					1200	3.80	34.58	1.82	27.49	60	2.11
774	5.53	34.532	1.70	82	1500	2.93	34.62	1.46	27.61	49	2.30
977	4.64	34.561	1.58	70	2000	2.18	34.66		27.71	40	2.57
1175	3.90	34.576	1.87	61	2500	1.79	34.68	1.80	27.75	35	2.81
1377	3.18	34.609	1.39	52	3000	1.63	34.68	1.94	27.77	34	3.03
1575	2.78	34.625	1.48	47	4000	1.48	34.70	2.50	27.79	32	3.47
1772	2.44	34.629	1.51	44	5000	1.49	34.71	2.69	27.80	31	3.92
1974	2.20	34.65	-	41	6000	1.60	34.70	3.07	27.78	32	4.40
2470	1.82	34.678	1.80	36	7000	1.74	34.71	3.23	27.78	33	4.93
2975	1.64	34.680	1.94	34	8000	1.91	34.71	3.23	27.77	34	5.51
3278	1.56	34.70	2.01	32							
3582	1.52	34.696	2.20	32							
3889	1.50	34.700	2.50c)	32							
4194	1.44	34.702	2.48	31							
4504	1.44	34.721u	2.41								
5023	1.50	34.710	2.70	31							
5545	1.54	34.710	3.03	31							
6061	1.60	34.703	3.08	32							
6602	1.68	34.703	3.10	33							
6781	1.71	34.713	3.15	32							
7283	1.78	34.711	3.28	33							
7785	1.86	34.703	3.27	34							
8287	1.96	34.710	3.15	34							
8792	2.03	34.701	3.07	35							

a) Second cast: April 12, 1962; 2142 GCT; 11°20.5'N, 142°22.5'E; sounding, 5000+ fm; wire angle, 25°. Third cast: April 13, 1962; 1940 GCT; 11°17.5'N, 142°11'E; sounding, 5310 fm; wire angle, 04°.

b) Possible evaporation; value falls on property curve.

c) Alternate value, 2.08 ml/L, not used in interpolation.

SIO PROA	OBSERVED				COMPUTED	INTERPOLATED				COMPUTED		
	Z m	T °C	S ‰	O_2 ml/L	δ_T cl/ton	Z m	T °C	S ‰	O_2 ml/L	σ_t g/L	δ_T cl/ton	ΔD dyn m

H-14

SPENCER F. BAIRD; April 23, 1962; 1743 GCT; 7°44'N, 134°55.5'E;[a)] sounding, 4205 fm; wind, 360°, force 1; weather, drizzle; sea, moderate; wire angle, 03°.

Z	T	S	O_2	δ_T	Z	T	S	O_2	σ_t	δ_T	ΔD
1	28.14	33.676	1.62b)	643	0	(28.14)	(33.68)	c)	(21.38)	(643)	(0.00)
11	28.34	34.221	1.68	610	10	28.33	34.21		21.71	610	0.06
25	28.26	34.246	1.59	606	20	28.30	34.24		21.75	607	0.12
52	27.78	34.299	1.76	587	30	28.20	34.26		21.79	603	0.18
62	27.48	34.396	1.89	571	50	27.83	34.29		21.94	589	0.30
77	26.46	34.442	1.66	536	75	26.60	34.44		22.44	540	0.45
87	24.98	34.529	1.44	486	100	22.65	34.77		23.88	403	0.56
97	23.35	34.763	2.10	423	125	20.11	34.81		24.61	334	0.66
107	21.52	34.786	2.47	372	150	18.01	34.76		25.10	287	0.74
116	20.80	34.806	2.79	352	200	12.19	34.53		26.21	182	0.86
127	19.94	34.808	2.65	330	250	10.55	34.52		26.50	154	0.94
136	19.09	34.799	2.27	310	300	9.03	34.58		26.80	125	1.02
145	18.33	34.771	2.62	293	400	8.07	34.57		26.95	112	1.14
154	17.72	34.740	3.08	281	500	7.07	34.54		27.07	100	1.25
185	14.14	34.584	2.51	215	600	6.41	34.54		27.16	92	1.36
210	11.61	34.526	1.86	172	700	5.92	34.54		27.22	86	1.46
238	10.88	34.517	1.79	160	800	5.35	34.54		27.29	79	1.55
259	10.25	34.516	1.72	149	1000	4.42	34.57		27.42	67	1.71
					1200	3.64	34.59		27.52	58	1.86
277	9.58	34.566	1.44	135	1500	2.91	34.62		27.61	49	2.05
303	8.97	34.580	1.36	124	2000	2.20	34.66		27.71	40	2.32
352	8.58	34.598	1.43	117	2500	1.76	34.68		27.76	35	2.55
407	8.00	34.568	1.71	111	3000	1.59	34.70		27.78	32	2.77
507	7.02	34.540	1.91	100	4000	1.51	34.71		27.80	31	3.20
613	6.34	34.537	1.93	91	5000	1.58	34.70		27.79	32	3.65
720	5.82	34.535	1.82	85	6000	1.70	34.70		27.78	33	4.16
820	5.23	34.547	1.87	77	7000	1.87	34.69		27.76	35	4.71
926	4.78	34.566	1.83	71	8000	(2.00)	(34.70)		(27.75)	(35)	(5.33)
1137	3.83	34.582	1.89	60							
1447	3.03	34.614	2.06	50							
1757	2.46	34.645	2.33	43							
2171	2.04	34.663	2.55	38							
2586	1.70	34.691	2.80	34							
3102	1.58	34.705	3.13	32							
3625	1.54	34.707	3.22	31							
4149	1.50	34.706	3.39	31							
4666	1.54	34.709	3.49	31							
5000	1.58	34.73 u	2.09								
5485	1.59	34.69	1.46	33							
5971	1.69	34.706	1.37	33							
6456	1.77	34.696	1.09	34							
6943	1.86	34.692	0.94	35							
7434	1.92	34.692	0.86	35							
7929	1.99	34.696	1.04	36							

a) Second cast: 2018 GCT; wire angle, 07°. Third cast: 1220 GCT; wire angle, 10°.
b) Alternate value, 1.48 ml/L, not used in interpolation.
c) Unusual oxygen values; no interpolation made.

OBSERVED				COMPUTED	INTERPOLATED				COMPUTED		
Z m	T °C	S ‰	O_2 ml/L	δ_T cl/ton	Z m	T °C	S ‰	O_2 ml/L	σ_t g/L	δ_T cl/ton	ΔD dyn m

SIO PROA

SPENCER F. BAIRD; April 29-28, 1962; 0112, 2200 GCT; 9°50'N, 138°33'E; sounding, 4100 fm; wind, 040°, force 5; weather, partly cloudy; sea, moderate; wire angle, 02°, 15°. H-.20

1	28.18	34.143	4.14	610	0	(28.18)	(34.14)	(4.14)	(21.71)	(611)	(0.00)
11	28.18	34.148	4.17	610	10	28.18	34.15	4.16	21.72	610	0.06
26	28.02	34.142	4.09	606	20	28.10	34.14	4.14	21.74	608	0.12
52	27.42	34.321	4.07	574	30	27.96	34.14	4.08	21.78	604	0.18
82	25.50	34.645	4.05	493	50	27.47	34.31	4.07	22.07	576	0.30
97	24.36	34.718	3.93	455	75	26.11	34.57	4.07	22.70	516	0.44
112	23.70	34.685	3.92	438	100	24.21	34.71	3.93	23.38	451	0.56
131	18.97	34.733	3.51	312	125	20.35	34.72	3.60	24.48	347	0.66
145	17.11	34.691	3.51	271	150	16.54	34.66	3.50	25.38	260	0.74
164	15.27	34.580	3.43	239	200	13.00	34.46	3.03	25.99	202	0.86
183	14.27	34.520	3.29	223	250	10.14	34.49	1.80	26.55	149	0.95
210	12.12	34.428	2.77	188	300	9.04	34.53	1.64	26.76	129	1.02
234	10.64	34.458	2.06	160	400	8.11	34.55	1.65	26.92	114	1.15
258	9.93	34.501	1.72	145	500	7.37	34.55	1.62	27.03	104	1.26
288	9.31	34.533	1.61	133	600	6.69	34.53	1.46	27.11	96	1.37
327	8.56	34.533	1.69	122	700	6.06	34.52	1.51	27.19	89	1.47
371	8.32	34.544	1.67	117	800	5.51	34.53	1.56	27.26	82	1.57
411	8.00	34.543	1.72	113	1000	4.56	34.54	1.36	27.38	70	1.74
					1200	3.73	34.57	1.59	27.49	60	1.89
410a)	8.04	34.553	1.60	113	1500	2.89	34.60	1.80	27.60	50	2.09
461	7.59	34.543	1.62	107	2000	2.16	34.65	1.97	27.70	40	2.36
509	7.32	34.547	1.61	103	2500	1.80	34.67	2.25	27.74	36	2.60
555	7.02	34.536	1.48	100	3000	(1.60)	(34.68)		(27.77)	(34)	(2.82)
654	6.32	34.521	1.46	92							
750	5.78	34.527	1.59	85							
1046	4.36	34.547	1.36	68							
1344	3.26	34.588	1.80	54							
1736	2.49	34.627	1.79	45							
2136	2.03	34.66	2.06	39							
2534	1.79	34.668	2.29	36							
2953	1.61	34.680	2.56	34							

SPENCER F. BAIRD; May 11, 1962; 0745 GCT; 5°58.5'S, 152°15'E; sounding, 4500 fm; wind, 150°, force 3; weather, overcast; sea, moderate; wire angle, missing. H-24

5208	2.18	34.711	3.32	36
5699	2.24	34.710	3.25	36
6189	2.32	34.714	3.24	37
6678	2.39	34.701	2.90	38
7161	2.47	34.706	2.81	39
7659	2.57	34.707	2.64	39
8150	2.64	34.709b)	2.70	40

a) Overlapping casts; reconciliation of property curves when necessary.

b) An error of -10 ohms in salinometer reading has been assumed. The tabulated observed values incorporate the correction.

SIO PROA	OBSERVED				COMPUTED	INTERPOLATED				COMPUTED		
	Z	T	S	O_2	δ_T	Z	T	S	O_2	σ_t	δ_T	ΔD
	m	°C	‰	ml/L	cl/ton	m	°C	‰	ml/L	g/L	cl/ton	dyn m

H-34

SPENCER F. BAIRD; May 19, 1962; 0508, 0557 GCT; 6°17'S, 153°44.5'E;[a] sounding, 4883 fm; wind, 360°, force 2; weather, drizzle; sea, slight; wire angle, 06°, 08°.

Z	T	S	O_2	δ_T	Z	T	S	O_2	σ_t	δ_T	ΔD
1	29.46	34.405	4.13	632	0	(29.46)	(34.40)	b)	(21.48)	(633)	(0.00)
11	29.50	34.568	4.18	622	10	29.50	34.53		21.56	625	0.06
26	29.41	34.76	4.02	605	20	29.45	34.67		21.69	613	0.12
52	29.29	35.19	3.71	571	30	29.40	34.82		21.82	601	0.19
81	28.61	35.295	3.50	541	50	29.30	35.17		22.11	572	0.30
107	28.22	35.41	3.39	521	75	28.76	35.27		22.37	548	0.44
133	27.60	35.503	3.25	495	100	28.34	35.38		22.59	527	0.58
156	26.24	35.559	3.10	449	125	27.85	35.47		22.82	505	0.71
181	23.64	35.515	2.98	377	150	26.74	35.55		23.24	465	0.83
211	20.98	35.621	2.82	298	200	22.00	35.58		24.68	327	1.03
241	17.47	35.412	2.68	227	250	16.53	35.33		25.90	211	1.17
275	14.04	35.111	2.74	175	300	12.69	34.99		26.47	157	1.27
310	12.28	34.957	3.30	152	400	8.60	34.66		26.94	113	1.41
					500	7.23	34.55		27.05	102	1.53
367	10.02	34.770	3.58	127	600	6.63	34.53		27.12	95	1.63
413	8.24	34.633	3.55	110	700	5.93	34.53		27.21	87	1.73
516	7.12	34.547	3.53	100	800	5.19	34.50		27.28	80	1.83
616	6.54	34.534	3.39	94	1000	4.40	34.52		27.38	70	2.00
721	5.78	34.533	3.26	85	1200	3.69	34.56		27.49	60	2.15
					1500	2.93	34.60		27.59	50	2.34
826	5.06	34.495	2.52	79	2000	2.21	34.64		27.69	41	2.62
1036	4.27	34.537	2.16	68	2500	1.93	34.67		27.73	37	2.87
1243	3.56	34.572	2.00	58	3000	1.94	34.70		27.76	35	3.10
1452	3.02	34.597	1.91	51	4000	2.03	34.70		27.75	36	3.60
1657	2.66	34.614	1.88	47	5000	2.17	34.70		27.74	37	4.16
1862	2.32	34.646	2.19	42	6000	2.29	34.70		27.73	38	4.77
2070	2.17	34.644	2.29	41	7000	2.44	34.70		27.72	39	5.44
2582	1.92	34.678	2.56	36	8000	(2.60)	(34.70)		(27.70)	(40)	(6.18)
3102	1.94	34.699	2.84	35							
3411	1.94	34.699	3.05	35							
3722	2.00	34.704	3.17	35							
4033	2.04	34.705	3.02	35							
4339	2.08	34.695u	3.19								
4648	2.10	34.705	3.20	36							
5167	2.18	34.702	3.21	37							
5684	2.24	34.700	3.32	37							
6198	2.32	34.705	3.34	37							
6710	2.40	34.706	3.34	38							
5863c)	2.27	34.704	2.15	37							
6355	2.33	34.701	2.32	38							
6848	2.41	34.707	2.31	38							
7344	2.48	34.693	2.21	40							
7839	2.57	34.700	2.33	40							

a) Third cast: May 17, 1962; 2247 GCT; wire angle, 07°. Fourth cast: May 17, 1962; 1743 GCT; wire angle, 00°.
b) Unusual oxygen values; no interpolation made.
c) Overlapping casts; reconciliation of property curves when necessary.

SIO PROA

H-42

OBSERVED				COMPUTED	INTERPOLATED				COMPUTED		
Z m	T °C	S ‰	O_2 ml/L	δ_T cl/ton	Z m	T °C	S ‰	O_2 ml/L	σ_t g/L	δ_T cl/ton	ΔD dyn m

SPENCER F. BAIRD; May 29, 1962; 0838 GCT;[a] 12°15'S, 165°46.5'E;[b] sounding, 4336 fm; wind, 070°, force 4; weather, cloudy; sea, rough; wire angle, 06°.

Z m	T °C	S ‰	O_2 ml/L	δ_T cl/ton	Z m	T °C	S ‰	O_2 ml/L	σ_t g/L	δ_T cl/ton	ΔD dyn m
1	29.16	34.499	3.87	616	0	(29.16)	(34.50)	(3.87)	(21.66)	(616)	(0.00)
11	29.18	34.506	4.01	616	10	29.18	34.50	4.00	21.65	617	0.06
21	29.18	34.51	3.97	616	20	29.18	34.51	3.97	21.66	616	0.12
31	29.18	34.504	3.98	616	30	29.18	34.50	3.98	21.65	617	0.19
51	29.18	34.510	3.91	616	50	29.18	34.51	3.91	21.66	616	0.31
76	29.16	34.545	4.01	613	75	29.16	34.54	4.00	21.69	613	0.46
95	28.49	35.280	3.60	539	100	28.00	35.30	3.41	22.64	522	0.61
115	27.94	35.364	3.34	515	125	27.50	35.38	3.28	22.86	500	0.73
136	26.75	35.389	3.22	477	150	26.06	35.42	3.15	23.35	454	0.86
156	25.73	35.453	3.09	442	200	22.99	35.87	2.74	24.62	333	1.06
175	24.38	35.650	2.85	388	250	19.63	35.63	2.77	25.36	263	1.21
195	23.32	35.879	2.75	342	300	16.94	35.37	2.64	25.83	218	1.33
230	20.54	35.712	2.76	280	400	12.20	34.91	3.07	26.50	154	1.53
260	19.18	35.593	2.77	254	500	8.72	34.63	2.91	26.89	117	1.67
300	16.94	35.374	2.64	217	600	6.71	34.54	2.84	27.12	96	1.79
349	14.30	35.107	2.73	180	700	5.78	34.52	2.76	27.22	86	1.89
405	12.00	34.889	3.09	152	800	5.23	34.51	2.60	27.28	80	1.98
465	9.84	34.710	3.18	128	1000	4.33	34.54	2.50	27.41	68	2.15
					1200	3.71	34.56	2.51	27.49	60	2.30
479	9.24	34.672	2.76	122	1500	3.08	34.59	2.52	27.57	52	2.50
570	7.14	34.549	2.85	101	2000	2.35	34.65	2.55	27.68	42	2.78
669	6.00	34.525	2.81	88	2500	1.95	34.67	2.72	27.73	37	3.03
764	5.40	34.508	2.64	82	3000	1.80	34.68	2.87	27.75	35	3.27
955	4.52	34.533	2.50	71	4000	1.78	34.70	3.10	27.77	34	3.75
1144	3.86	34.56	2.51	62	5000	1.86	34.70	3.20	27.76	34	4.25
1432	3.20	34.581	2.51	54	6000	2.00	34.69	3.01	27.75	36	4.81
1720	2.73	34.621	2.56	47	7000	2.17	34.69	2.66	27.73	37	5.43
2012	2.34	34.649	2.55	42	8000	2.31	34.69	2.61	27.72	38	6.12
2407	1.99	34.666	2.68	38							
2909	1.83	34.683	2.88	35							
3211	1.76	34.687	2.85	35							
3516	1.76	34.685	2.90	35							
3824	1.76	34.696	3.04	34							
4125	1.80	34.693	3.11	34							
4436	1.81	34.699	3.10	34							
4942	1.85	34.696	3.19	35							
5447	1.92	34.697	3.21	35							
5734	1.97	34.689	3.06	36							
6200	2.03	34.696	3.00	36							
6667	2.12	34.696	2.89	37							
7135	2.18	34.686	2.52	38							
7606	2.25	34.692	2.64	38							
8083	2.32	34.690	2.61	39							
8563	2.42	34.686	2.61	40							

a) Shallow cast, H-43, is incorporated with the deeper casts of H-42 for computational purposes.

b) Second cast: May 28, 1962; 2235 GCT; 12°18'S, 165°46'E; sounding, 4240 fm; wire angle, 23°. Third cast: May 28, 1962; 1715 GCT; 12°17'S, 165°48.5'E; sounding, 4785 fm; wire angle, missing.

SIO
PROA

OBSERVED				COMPUTED	INTERPOLATED				COMPUTED		
Z m	T °C	S ‰	O_2 ml/L	δ_T cl/ton	Z m	T °C	S ‰	O_2 ml/L	σ_t g/L	δ_T cl/ton	ΔD dyn m

H-46 SPENCER F. BAIRD; June 4, 1962; 0622 GCT; 22°41'S, 166°18.5'E; sounding, 1205 fm; wind, 250°, force 2; weather, clear; sea, moderate; wire angle, 26°.

Z m	T °C	S ‰	O_2 ml/L	δ_T cl/ton	Z m	T °C	S ‰	O_2 ml/L	σ_t g/L	δ_T cl/ton	ΔD dyn m
0	24.67	35.229	4.38	427	0	24.67	35.23	4.38	23.64	427	0.00
46	24.65	35.250	4.29	425	10	(24.67)	(35.23)	(4.35)	(23.64)	(427)	(0.04)
90	23.56	35.638	4.30	366	20	(24.66)	(35.24)	(4.31)	(23.65)	(426)	(0.09)
137	20.48	35.723	3.82	277	30	(24.66)	(35.24)	(4.31)	(23.65)	(426)	(0.13)
181	19.04	35.733	3.98	241	50	24.65	35.26	4.29	23.66	424	0.21
270	17.82	35.68	4.06	215	75	24.23	35.55	4.30	24.01	391	0.32
358	15.00	35.368	3.86	176	100	22.65	35.65	4.18	24.55	340	0.41
445	12.16	35.023	3.86	145	125	20.93	35.70	3.85	25.06	291	0.49
534	10.07	34.811	3.97	125	150	20.01	35.73	3.86	25.33	265	0.56
713	6.84	34.533	3.92	98	200	18.73	35.73	4.02	25.67	233	0.69
897	4.83	34.482	3.68	78	250	18.10	35.70	4.07	25.80	220	0.80
1087	3.96	34.525	3.38	65	300	17.02	35.61	4.02	26.00	202	0.91
					400	13.56	35.19	3.85	26.44	159	1.10
					500	10.82	34.89	3.94	26.74	131	1.26
					600	8.74	34.68	3.97	26.93	113	1.40
					700	7.03	34.55	3.93	27.08	99	1.51
					800	5.73	34.49	3.82	27.21	87	1.62
					1000	4.25	34.50	3.53	27.38	70	1.79

SIO PROA

H-49

OBSERVED				COMPUTED	INTERPOLATED				COMPUTED		
Z m	T °C	S ‰	O_2 ml/L	δ_T cl/ton	Z m	T °C	S ‰	O_2 ml/L	σ_t g/L	δ_T cl/ton	ΔD dyn m

SPENCER F. BAIRD; June 6, 1962; 1810, 1849, 1455 GCT; 20°52.5'S, 168°37'E;[a] sounding, 3752 fm; wind, 150°, force 4; weather, cloudy; sea, moderate; wire angle, 13°, 18°, 02°.

Z m	T °C	S ‰	O_2 ml/L	δ_T cl/ton	Z m	T °C	S ‰	O_2 ml/L	σ_t g/L	δ_T cl/ton	ΔD dyn m
0	25.36	34.910	4.37	470	0	25.36	34.91	4.37	23.18	470	0.00
10	25.35	34.905	4.43	470	10	25.35	34.90	4.43	23.18	470	0.05
25	25.36	34.917	4.36	469	20	25.36	34.91	4.40	23.18	470	0.09
50	25.38	34.965	4.36	466	30	25.37	34.92	4.36	23.19	469	0.14
80	22.03	35.612	4.68	326	50	25.38	34.96	4.36	23.22	467	0.24
94	21.23	35.65	4.51	302	75	22.60	35.56	4.66	24.49	345	0.34
113	20.57	35.662	4.28	284	100	21.02	35.65	4.44	25.00	296	0.42
134	19.82	35.674	4.13	264	125	20.11	35.67	4.20	25.26	272	0.49
153	19.37	35.672	4.00	253	150	19.45	35.67	4.02	25.44	255	0.56
171	18.86	35.629	3.98	244	200	17.94	35.58	3.99	25.75	225	0.68
190	18.24	35.614	4.00	230	250	17.08	35.53	4.06	25.92	209	0.79
215	17.56	35.543	3.99	219	300	15.79	35.40	4.10	26.12	190	0.90
245	17.17	35.534	4.05	211	400	12.80	35.06	4.01	26.50	154	1.08
294	15.94	35.414	4.10	192	500	9.97	34.76	4.06	26.79	127	1.23
342	14.18	35.227	4.05	169	600	7.62	34.53	4.12	26.98	108	1.36
					700	6.23	34.42	4.11	27.09	98	1.47
395	12.94	35.080	4.01	156	800	5.36	34.40	3.97	27.18	90	1.58
455	10.92	34.862	4.07	135	1000	4.31	34.45	3.56	27.34	75	1.76
503	9.89	34.756	4.14	126	1200	3.45	34.53	3.33	27.49	60	1.91
					1500	2.83	34.59	3.14	27.60	50	2.11
467b)	10.70	34.842	4.02	133	2000	2.24	34.66	3.11	27.70	40	2.38
517	9.50	34.697	3.99	124	2500	2.01	34.68	3.19	27.74	37	2.63
623	7.22	34.495	4.13	106	3000	1.85	34.69	3.18	27.76	35	2.86
729	5.94	34.408	4.10	96	4000	1.88	34.70	3.21	27.76	34	3.35
835	5.12	34.404	3.88	87	5000	1.96	34.70	3.11	27.76	35	3.87
1040	4.12	34.470	3.50	71	6000	2.10	34.70	3.14	27.75	36	4.44
1246	3.32	34.544	3.28	58							
1557	2.76	34.601	3.11	49							
1868	2.36	34.646	3.10	42							
2179	2.14	34.673	3.16	38							
2488	2.02	34.673	3.19	38							
2803	1.90	34.687	3.19	36							
3113	1.84	34.688	3.17	35							
3425	1.86	34.685	3.39u								
3677	1.86	34.695	3.23	35							
3945	1.87	34.695	3.29	35							
3638b)	1.85	34.703	3.19	34							
4130	1.88	34.70	3.16	34							
4624	1.94	34.702	3.12	35							
5117	1.97	34.698	3.11	35							
5611	2.05	-	-								
6105	2.11	34.70	3.15	36							
6601	2.19	34.697	3.29	37							

a) Third cast: 0927 GCT; 20°33.5'S, 168°33'E; sounding, 3540 fm; wire angle, 05°. This cast, H-49, is incorporated with the three casts of H-50 for computational purposes.

b) Overlapping casts; reconciliation of property curves when necessary.

SIO PROA

OBSERVED				COMPUTED	INTERPOLATED				COMPUTED		
Z m	T °C	S ‰	O_2 ml/L	δ_T cl/ton	Z m	T °C	S ‰	O_2 ml/L	σ_t g/L	δ_T cl/ton	ΔD dyn m

H - 55

SPENCER F. BAIRD; June 8, 1962; 2128 GCT; 19°17'S, 174°49.5'E;[a)] sounding, 1780 fm; wind, 110°, force 4; weather, cloudy; sea, rough; wire angle, 10°.

Z m	T °C	S ‰	O_2 ml/L	δ_T cl/ton	Z m	T °C	S ‰	O_2 ml/L	σ_t g/L	δ_T cl/ton	ΔD dyn m
0	26.08	34.671	4.24	508	0	26.08	34.67	4.24	22.78	508	0.00
10	26.08	34.662	4.27	509	10	26.08	34.66	4.27	22.77	509	0.05
30	26.10	34.677	4.25	508	20	26.09	34.67	4.26	22.78	509	0.10
40	26.10	34.683	4.16	508	30	26.10	34.68	4.25	22.78	508	0.15
56	25.74	35.277	4.20	455	50	26.10	34.69	4.16	22.79	507	0.25
71	24.86	35.420	4.08	418	75	24.55	35.45	3.98	23.84	407	0.37
90	23.10	35.580	3.60	357	100	22.60	35.60	3.64	24.52	342	0.46
115	22.02	35.624	3.67	325	125	21.72	35.65	3.60	24.81	315	0.55
136	21.40	35.663	3.54	305	150	20.98	35.66	3.57	25.02	295	0.62
156	20.77	35.665	3.58	289	200	18.91	35.56	3.69	25.49	250	0.76
185	19.39	35.592	3.63	259	250	17.42	35.46	3.85	25.78	222	0.89
221	18.32	35.529	3.78	238	300	15.58	35.34	3.93	26.12	190	0.99
250	17.42	35.460	3.85	222	400	12.33	35.01	3.98	26.55	149	1.17
300	15.58	35.335	3.93	190	500	8.71	34.60	4.10	26.87	119	1.32
355	14.13	35.213	3.93	169	600	6.88	34.45	4.27	27.02	104	1.44
440	10.48	34.795	4.05	132	700	5.86	34.39	4.23	27.11	96	1.55
524	8.26	34.561	4.17	115	800	5.11	34.41	3.95	27.22	86	1.65
610	6.76	34.445	4.30	103	1000	4.11	34.48	3.53	27.38	70	1.82
					1200	3.53	34.52	3.45	27.47	62	1.97
468b)	9.54	34.685	4.06	125	1500	2.91	34.58	3.22	27.58	52	2.17
517	8.16	34.54	4.09	115	2000	2.24	34.63	3.20	27.68	42	2.46
573	7.26	34.481	4.23	107	2500	2.01	34.66	3.15	27.72	38	2.71
624	6.60	34.426	4.30	103	3000	2.00	34.67	3.17	27.73	38	2.96
725	5.65	34.380	4.18	95							
831	4.92	34.424	3.86	83							
936	4.34	34.441	3.66	76							
1040	3.99	34.496	3.48	68							
1196	3.54	34.523	3.46	62							
1352	3.16	34.556	3.26	56							
1507	2.90	34.579	3.21	52							
1664	2.60	34.611	3.15	47							
1820	2.48	34.622	3.17	45							
1977	2.27	34.637	3.21	42							
2183	2.14	34.656	3.15	40							
2393	2.05	34.662	3.15	39							
2758	1.97	34.661	3.14	38							
3121	2.01	34.676	3.25	37							

a) Second cast: June 9, 1962; 0023 GCT; 19°18'S, 174°51'E; wire angle, 07°.
b) Overlapping casts; reconciliation of property curves when necessary.

OBSERVED				COMPUTED	INTERPOLATED				COMPUTED			SIO
Z	T	S	O_2	δ_T	Z	T	S	O_2	σ_t	δ_T	ΔD	PROA
m	°C	‰	ml/L	cl/ton	m	°C	‰	ml/L	g/L	cl/ton	dyn m	

SPENCER F. BAIRD; June 19-20, 1962; 1951, 1046 GCT; 8°44'S, 173°24'E; sounding, 2865 fm; wind, 120°, force 3; weather, cloudy; sea, moderate; wire angle, 15°, 16°. H-62

0	28.87	34.396	3.76	614	0	28.87	34.40	3.76	21.68	614	0.00
10	-	34.394	2.45u		10	28.94	34.39		21.65	617	0.06
30	29.10	34.531	3.62	612	20	29.04	34.48	3.66	21.68	614	0.12
59	29.10	34.542	3.52	611	30	29.10	34.53	3.62	21.70	612	0.18
68	29.30	34.783	3.53	600	50	29.10	34.54	3.53	21.71	611	0.31
82	29.12	35.307	3.56	557	75	29.23	35.07	3.55	22.06	577	0.46
96	28.79	34.526u	3.52		100	28.63	35.39	3.40	22.50	535	0.60
110	27.90	35.434	3.08	509	125	26.35	35.56	2.44	23.37	452	0.72
135	25.64	35.619	2.25	427	150	24.99	35.67	2.18	23.87	404	0.83
153	24.86	35.684	2.17	399	200	22.18	35.84	2.14	24.82	313	1.01
181	23.38	35.842	2.07	346	250	18.20	35.52	2.45	25.64	236	1.15
210	21.47	35.828	2.23	295	300	14.49	35.12	2.11	26.19	183	1.26
237	19.22	35.629	2.47	253	400	9.94	34.75	1.70	26.79	127	1.43
286	15.48	35.215	2.28	197	500	7.88	34.64	2.11	27.03	104	1.55
337	12.31	34.922	1.74	155	600	6.84	34.58	2.32	27.13	94	1.66
418	9.45	34.721	1.70	121	700	6.01	34.55	2.49	27.22	86	1.76
500	7.98	34.630	2.07	106	800	5.31	34.53	2.59	27.29	79	1.85
584	7.00	34.583	2.25	96	1000	4.43	34.55	2.55	27.40	68	2.02
					1200	3.69	34.57	2.53	27.50	60	2.17
550a)	7.17	34.601	2.25	97	1500	2.87	34.61	2.68	27.61	49	2.36
596	6.86	34.573	2.36	95	2000	2.16	34.64	2.78	27.69	41	2.63
644	6.44	34.581	2.44	89	2500	1.87	34.67	2.86	27.74	37	2.87
697	6.04	34.551	2.48	86	3000	1.69	34.68	2.97	27.76	35	3.10
798	5.32	34.53	2.59	79	4000	1.33	34.71	3.81	27.81	30	3.53
997	4.44	34.548	2.56	69							
1194	3.71	34.567	2.52	60							
1397	3.10	34.585	2.68	53							
1594	2.69	34.631	2.68	46							
1791	2.41	34.636	2.78	43							
2092	2.08	34.648	2.78	40							
2393	1.93	34.666	2.83	37							
2703	1.77	34.674	2.90	36							
3006	1.68	34.677	2.97	35							
3416	1.50	34.700	3.09	32							
3826	1.38	34.711	3.61	30							
4347	1.28	34.712	4.01	29							
4857	1.30	34 719	3.98	29							

a) Overlapping casts; reconciliation of property curves when necessary.

SIO PROA

H-77

SPENCER F. BAIRD; June 27, 1962; 0925, 0526 GCT; 8°11'S, 179°41'E; sounding, 2807 fm; wind, 100°, force 3; weather, cloudy; sea, rough; wire angle, 28°, 07°.

OBSERVED				COMPUTED	INTERPOLATED				COMPUTED		
Z m	T °C	S ‰	O_2 ml/L	δ_T cl/ton	Z m	T °C	S ‰	O_2 ml/L	σ_t g/L	δ_T cl/ton	ΔD dyn m
0	29.00	35.044	4.00	572	0	29.00	35.04	4.00	22.12	572	0.00
9	-	35.039	3.98		10	29.01	35.04	3.97	22.11	572	0.06
27	29.02	35.042	3.90	573	20	29.02	35.04	3.94	22.11	573	0.11
55	29.02	35.042	3.96	573	30	29.02	35.04	3.91	22.11	573	0.17
64	29.02	35.036	4.01	573	50	29.02	35.04	3.95	22.11	573	0.29
78	29.02	35.038	3.93	573	75	29.02	35.04	3.95	22.11	573	0.43
91	29.06	-	-		100	28.53	35.42	3.79	22.56	530	0.57
103	28.20	35.623	3.63	505	125	26.90	35.79	3.28	23.37	452	0.69
128	26.74	35.811	3.26	446	150	25.99	35.94	3.10	23.77	414	0.80
145	26.20	35.904	3.15	423	200	22.59	36.02	2.97	24.84	311	0.99
172	24.50	36.028	2.90	364	250	17.48	35.43	2.74	25.75	226	1.13
199	22.62	36.022	2.97	312	300	12.84	34.95	2.16	26.40	163	1.23
225	20.12	35.760	2.98	265	400	9.11	34.70	2.00	26.89	118	1.38
271	15.48	35.206	2.48	198	500	7.37	34.59	2.24	27.06	101	1.49
319	11.74	34.863	2.02	149	600	6.53	34.57	2.35	27.17	91	1.60
396	9.20	34.700	1.99	119	700	6.02	34.55	2.15	27.22	86	1.69
471	7.74	34.606	2.17	104	800	5.41	34.53	2.03	27.28	81	1.79
547	6.90	34.576	2.45	95	1000	4.56	34.55	2.15	27.39	70	1.96
					1200	3.63	34.57	2.22	27.50	59	2.11
566	6.96	34.580	2.18	96	1500	2.84	34.59	2.28	27.59	50	2.30
616	6.45	34.561	2.32	91	2000	2.19	34.65	2.42	27.70	41	2.58
666	6.29	34.554	2.22	89	2500	1.80	34.68	2.60	27.75	35	2.81
721	5.86	34.550	2.11	84	3000	1.67	34.67	2.82	27.75	35	3.04
826	5.32	34.529	1.99	80	4000	1.36	34.71	3.49	27.81	30	3.47
1032	4.42	34.548	2.18	68							
1237	3.49	34.575	2.23	57							
1547	2.76	34.600	2.30	49							
1857	2.38	34.638	2.39	43							
2168	2.00	34.665	2.48	38							
2583	1.78	34.678	2.63	35							
3109	1.64	34.668	2.50u								
3425	1.56	34.700	3.00	32							
3742	1.48	34.694	3.17	32							
4061	1.33	34.711	3.62a)	30							

a) Alternate value, 3.76 ml/L, not used in interpolation.

SIO
PROA

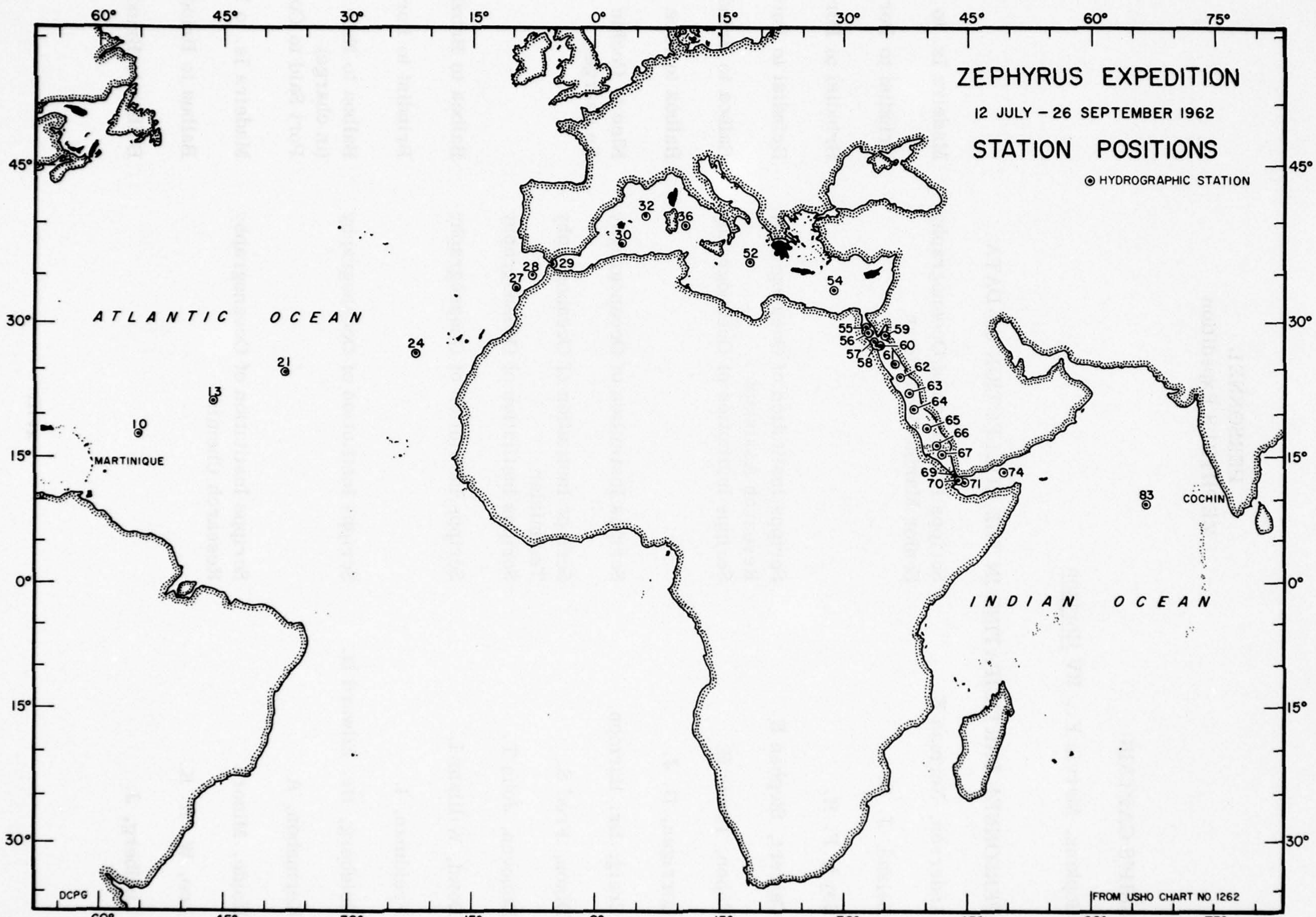
OBSERVED				COMPUTED	INTERPOLATED				COMPUTED		
Z m	T °C	S ‰	O_2 ml/L	δ_T cl/ton	Z m	T °C	S ‰	O_2 ml/L	σ_t g/L	δ_T cl/ton	ΔD dyn m

SPENCER F. BAIRD; July 6, 1962; 2312, 1533 GCT; 7°58'N, 164°57'E; sounding, 2847 fm; wind, 050°, force 3; weather, partly cloudy; sea, rough; wire angle, 20°, 25°. H-92

1	28.40	34.265	3.89	609	0	(28.40)	(34.26)	(3.89)	(21.73)	(609)	(0.00)
10	28.40	34.260	3.69	609	10	28.40	34.26	3.69	21.73	609	0.06
30	28.42	34.261	3.83	610	20	28.41	34.26	3.75	21.73	609	0.12
59	28.42	34.263	3.86	609	30	28.42	34.26	3.83	21.72	610	0.18
68	28.42	34.267	3.76	609	50	28.42	34.26	3.86	21.72	610	0.31
82	28.44	34.384	3.84	601	75	28.43	34.31	3.79	21.76	606	0.46
97	28.09	34.388	3.60	590	100	27.99	34.40	3.61	21.97	586	0.61
112	27.17	34.558	3.91	549	125	24.40	34.77	3.63	23.37	452	0.74
136	21.84	34.829	3.36	377	150	18.45	34.73	3.08	24.97	299	0.83
154	17.47	34.690	3.01	279	200	11.37	34.49	1.43	26.33	170	0.95
180	12.94	34.470	2.29	200	250	10.01	34.63	0.56	26.68	137	1.03
210	10.90	34.508	1.12	161	300	9.49	34.65	0.54	26.78	127	1.10
236	10.20	34.610	0.59	141	400	8.57	34.61	0.70	26.90	116	1.23
281	9.70	34.648	0.53	131	500	7.82	34.59	0.74	27.00	107	1.35
330	9.16	34.636	0.55	123	600	6.96	34.57	0.77	27.11	97	1.46
408	8.51	34.606	0.71	115	700	6.08	34.55	0.76	27.21	87	1.56
489	7.91	34.582	0.72	109	800	5.40	34.55	0.86	27.29	79	1.65
572	7.28	34.573	0.85	101	1000	4.46	34.56	1.10	27.41	68	1.82
					1200	3.78	34.58	1.31	27.50	60	1.97
510a)	7.74	34.594	0.76	105	1500	2.99	34.61	1.50	27.60	50	2.16
555	7.26	34.582	0.79	100	2000	2.19	34.64	1.90	27.69	41	2.44
607	6.90	34.564	0.76	96	2500	1.85	34.67	2.28	27.74	36	2.69
658	6.42	34.550	0.72	91	3000	1.68	34.68	2.40	27.76	35	2.91
754	5.70	34.543	0.80	83	4000	1.44	34.69	3.11	27.79	32	3.36
940	4.70	34.560	1.03	70							
1129	4.00	34.575	1.25	62							
1412	3.20	34.600	1.46	53							
1696	2.60	34.629	1.65	45							
1984	2.20	34.642	1.86	41							
2366	1.92	34.663	2.27	38							
2846	1.72	34.677	2.31	35							
3139	1.63	34.677	2.50	34							
3428	1.52	34.686	2.74	33							
3728	1.46	34.691	2.92	32							
4028	1.44	34.696	3.13	32							
4331	1.40	34.705	3.32	31							
4831	1.40	34.710	3.57	30							

a) Overlapping casts; reconciliation of property curves when necessary.

FIGURES
ZEPHYRUS Expedition


ZEPHYRUS EXPEDITION
12 JULY – 26 SEPTEMBER 1962
STATION POSITIONS
HYDROGRAPHIC STATION
ATLANTIC OCEAN
INDIAN OCEAN
MARTINIQUE
COCHIN
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60°
45°
30°
15°
0°
75°
DCPG
FROM USHO CHART NO 1262

FIGURE 1

PERSONNEL
ZEPHYRUS Expedition

SHIP'S CAPTAIN

Hopkins, Marvin F., RV Horizon

PERSONNEL PARTICIPATING IN THE COLLECTION OF DATA

Anderson, Norman E.	Scripps Institution of Oceanography Senior Marine Technician	Madeira Is. to Cochin
Belshé, J. C.		Brindisi to Port Said
Boyd, F. R.		Brindisi to Port Said
Calvert, Stephen E.	Scripps Institution of Oceanography Research Assistant	Brindisi to Port Said
Cohen, Lewis H.	Scripps Institution of Oceanography	Balboa to Brindisi
Corrigan, D. J.		Balboa to Nice
Craig, Dr. Harmon	Scripps Institution of Oceanography	Nice to Cochin (in charge)
Dixon, Fred S.	Scripps Institution of Oceanography Technician	
Donovan, John T.	Scripps Institution of Oceanography	
Dowd, William L.	Scripps Institution of Oceanography	Balboa to Brindisi
Freidman, I.		Brindisi to Port Said
Goldberg, Dr. Edward D.	Scripps Institution of Oceanography	Balboa to Nice (in charge)
Kermabon, A.		Port Said to Cochin
Koide, Minoru	Scripps Institution of Oceanography Research Chemist	Madeira Is. to Brindisi
Lee, W. H. K.		Balboa to Brindisi
Lindberg, J.		Balboa to Brindisi

Longinelli, A.		Port Said to Cochin
Lowenstien, H. A.		Brindisi to Port Said
MacKenzie, Glenn S.	Scripps Institution of Oceanography	Balboa to Brindisi
McBirney, Dr. Alexander R.	Scripps Institution of Oceanography	Balboa to Madeira Is.
McGehee, Maurice S.	Scripps Institution of Oceanography Associate Engineer	
Menard, Dr. Henry W.	Scripps Institution of Oceanography	Madeira Is. to Brindisi
Nason, Robert D.	Scripps Institution of Oceanography	Balboa to Brindisi
Rees, Dr. Anthony I.	Scripps Institution of Oceanography	Brindisi to Port Said
Van Andel, Dr. T.	Scripps Institution of Oceanography	Brindisi to Port Said (in charge)
Williams, H.		Balboa to Madeira Is.

OBSERVED			COMP	INTERPOLATED			COMPUTED		
Z m	T °C	S ‰	δ_T cl/ton	Z m	T °C	S ‰	σ_t g/L	δ_T cl/ton	ΔD dyn m

10

HORIZON; July 12, 1962; 1229, 1753 GCT; 17°28'N 55°27'W; sounding, 2942 fm; wind, 110°, force 4; weather, drizzle; sea, rough; wire angle, 17°, 09°.

Z m	T °C	S ‰	δ_T cl/ton	Z m	T °C	S ‰	σ_t g/L	δ_T cl/ton	ΔD dyn m
0	27.30	34.175	581	0	27.30	34.18	22.03	581	0.00
10	27.32	34.200	580	10	27.32	34.20	22.04	580	0.06
38	26.92	36.989	367	20	27.31	34.23	22.06	577	0.12
53	25.74	37.164	319	30	27.27	34.76	22.47	538	0.17
72	24.46	37.216	278	50	25.96	37.14	24.68	327	0.26
96	22.66	37.117	234	75	24.28	37.21	25.25	273	0.33
143	20.22	36.842	190	100	22.38	37.09	25.72	229	0.40
192	18.23	36.561	161	125	21.07	36.95	25.98	204	0.45
265	15.63	36.113	135	150	19.92	36.80	26.17	185	0.50
337	14.18	35.901	120	200	17.92	36.51	26.47	157	0.59
412	12.58	35.643	107	250	16.08	36.18	26.65	140	0.67
486	10.66	35.337	95	300	14.89	36.00	26.78	127	0.74
585	8.65	35.077	83	400	12.86	35.70	26.98	108	0.87
684	6.92	34.847	75	500	10.35	35.29	27.14	94	0.98
783	6.05	-		600	8.37	35.03	27.26	82	1.08
883	5.47	34.798	61	700	6.75	34.83	27.34	74	1.17
982	5.34	34.828	57	800	5.93	34.78	27.41	68	1.25
1182	5.15	34.962	45	1000	5.32	34.84	27.53	56	1.40
				1200	5.11	34.97	27.66	44	1.53
940a)	5.40	34.791	61	1500	4.32	35.01	27.78	33	1.69
1134	5.24	34.945	47	2000	3.47	34.98	27.85	27	1.91
1332	4.76	35.011	37	2500	2.96	34.95	27.87	24	2.12
1625	4.04	35.007	30	3000	2.65	34.93	27.88	23	2.33
2017	3.44	34.979	26	4000	2.32	34.89	27.88	23	2.76
2410	3.02	34.955	24	5000	1.90	34.84	27.87	24	3.19
2805	2.77	34.936	24						
3300	2.51	-							
3796	2.4 b)	-							
4293	2.18	34.879	23						
4790	1.92	34.844	24						
5287	1.88	34.834	24						

a) Overlapping casts; reconciliation of property curves when necessary.
b) Temperature inferred from pressure thermometer and wire depth.

SIO
ZEPHYRUS

OBSERVED			COMP	INTERPOLATED			COMPUTED		
Z m	T °C	S ‰	δ_T cl/ton	Z m	T °C	S ‰	σ_t g/L	δ_T cl/ton	ΔD dyn m

13 HORIZON; July 15, 1962; 2130, 1920, 1730 GCT; 21°05'N, 46°33.5'W; sounding, 2140 fm; wind, 070°, force 4; weather, partly cloudy; sea, very rough; wire angle, 10°, 09°, 15°.

Z m	T °C	S ‰	δ_T cl/ton	Z m	T °C	S ‰	σ_t g/L	δ_T cl/ton	ΔD dyn m
0	26.02	37.396	310	0	26.02	37.40	24.86	310	0.00
10	26.03	37.391	311	10	26.03	37.39	24.85	311	0.03
59	25.39	37.451	288	20	26.02	37.39	24.85	311	0.06
69	25.30	37.481	283	30	26.02	37.39	24.85	311	0.09
84	24.78	37.444	270	50	25.90	37.44	24.93	304	0.16
108	23.62	37.393	241	75	25.14	37.47	25.18	279	0.23
147	22.86	37.363	222	100	23.91	37.40	25.50	249	0.30
196	21.70	37.207	202	125	23.23	37.38	25.69	231	0.36
271	18.10	36.521	161	150	22.80	37.36	25.80	221	0.41
345	15.98	36.178	137	200	21.54	37.18	26.02	200	0.52
420	14.38	35.906	123	250	19.02	36.70	26.33	170	0.62
494	13.18	35.765	110	300	17.16	36.36	26.54	151	0.70
593	11.44	35.534	95	400	14.76	35.97	26.79	127	0.85
694	9.22	35.241	79	500	13.07	35.75	26.98	109	0.98
793	7.64	-		600	11.28	35.51	27.14	93	1.10
893	6.57	-		700	9.11	35.23	27.30	78	1.20
993	5.76	34.916	56	800	7.54	35.06	27.41	68	1.29
1142	5.31	34.947	48	1000	5.72	34.92	27.55	55	1.44
				1200	5.13	34.97	27.66	44	1.56
1274	4.92	34.992	40	1500	4.48	35.02	27.77	34	1.73
1571	4.33	35.023	32	2000	3.46	35.00	27.86	25	1.95
1968	3.51	35.002	25	2500	2.94	34.95	27.87	24	2.16
2365	3.02	-		3000	2.75	34.94	27.88	23	2.37
2607	2.91	-							
3000	2.75	34.936	23						
3394	2.55	34.918	23						
3788	2.34	34.893	23						

21 HORIZON; July 20, 1962; 2150, 1914, 1416 GCT; 24°34'N, 37°27.5'W; sounding, 2940 fm; wind, 040°, force 4; weather, overcast; sea, very rough; wire angle, 12°, 10°, 16°.

Z m	T °C	S ‰	δ_T cl/ton	Z m	T °C	S ‰	σ_t g/L	δ_T cl/ton	ΔD dyn m
0	25.14	37.560	273	0	25.14	37.56	25.25	273	0.00
10	25.17	37.560	273	10	25.17	37.56	25.24	273	0.03
39	25.06	37.545	271	20	25.17	37.56	25.24	273	0.05
49	23.30	37.273	241	30	25.16	37.56	25.25	273	0.08
63	22.64	37.211	227	50	23.26	37.27	25.60	240	0.13
82	21.43	37.112	202	75	21.86	37.14	25.90	211	0.19
106	20.70	37.071	185	100	20.85	37.08	26.14	189	0.24
144	19.86	36.956	172	125	20.31	37.03	26.24	178	0.29
191	18.04	36.565	156	150	19.63	36.92	26.34	169	0.33
261	16.68	36.292	145	200	17.97	36.55	26.48	156	0.42
332	15.46	36.095	132	250	16.92	36.33	26.57	147	0.50
404	14.31	35.940	120	300	16.00	36.18	26.67	138	0.57
476	13.20	35.790	108	400	14.37	35.95	26.86	120	0.71
574	12.02	35.643	97	500	12.90	35.75	27.01	106	0.84
673	10.59	-		600	11.67	(35.60)	(27.14)	(94)	(0.95)
822	8.60	-		700	10.20	(35.46)	(27.30)	(79)	(1.05)
971	7.12	35.159	55	800	8.87	(35.32)	(27.41)	(68)	(1.14)
1172	6.12	35.153	42	1000	6.93	35.16	27.57	52	(1.29)
				1200	6.02	35.15	27.69	41	(1.42)
1365	5.47	35.148	35	1500	5.04	35.13	27.79	31	(1.58)
1712	4.41	35.091	27	2000	3.79	35.04	27.86	25	(1.81)
2058	3.70	35.037	24	2500	3.11	34.98	27.88	23	(2.02)
2553	3.06	34.977	23	3000	2.71	34.94	27.89	23	(2.23)
3037	2.70	34.939	23	4000	2.42	34.91	27.89	23	(2.66)
				5000	2.39	34.89	27.87	24	(3.12)
3321	2.54	-							
3810	2.46	-							
4295	2.40	34.899	23						
4781	2.38	34.893	24						
5266	2.43	34.886	25						

OBSERVED			COMP	INTERPOLATED			COMPUTED		
Z m	T °C	S ‰	δ_T cl/ton	Z m	T °C	S ‰	σ_t g/L	δ_T cl/ton	ΔD dyn m

HORIZON; July 24, 1962; 1622, 1352, 1136 GCT; 26°43.5'N, 21°55'W; sounding, 2713 fm; wind, 030°, force 5; weather, cloudy; sea, very rough; wire angle, 15°, 10°, 15°. 24

0	22.94	37.044	247	0	22.94	37.04	25.52	247	0.00
10	22.97	37.040	248	10	22.97	37.04	25.51	248	0.02
48	22.37	37.028	233	20	22.97	37.04	25.51	248	0.05
58	21.44	37.010	209	30	22.97	37.04	25.51	248	0.07
66	21.07	36.998	200	50	22.03	37.02	25.76	224	0.12
82	20.38	36.962	185	75	20.68	36.98	26.11	191	0.17
96	19.98	36.923	178	100	19.87	36.91	26.27	176	0.22
145	18.42	36.644	160	125	19.11	36.78	26.37	166	0.27
193	16.81	36.339	144	150	18.26	36.61	26.46	158	0.31
266	15.31	36.111	128	200	16.62	36.31	26.63	142	0.39
339	14.30	35.956	118	250	15.57	36.15	26.75	131	0.46
412	13.19	35.803	107	300	14.85	36.04	26.82	123	0.52
485	12.35	35.687	100	400	13.37	35.83	26.98	109	0.65
584	11.20	35.555	89	500	12.19	35.66	27.08	99	0.77
706	9.66	-		600	10.99	35.53	27.21	87	0.87
978	7.46	35.215	55	700	9.72	35.38	27.32	77	0.97
1140	7.13	35.289	45	800	8.65	35.27	27.41	68	1.06
				1000	7.41	35.22	27.55	54	1.21
1265	6.84	35.327	39	1200	7.00	35.31	27.68	42	1.35
1562	5.40	35.220	29	1500	5.71	35.25	27.81	30	1.51
1956	4.19	35.098	25	2000	4.09	35.09	27.87	24	1.75
2453	3.34	35.014	23	2500	3.28	35.01	27.89	23	1.96
2947	2.81	-		3000	2.76	34.96	27.90	22	2.17
				4000	2.42	34.90	27.88	23	2.60
3374	2.56	-							
3868	2.44	34.904	23						
4367	2.39	34.896	24						
4867	2.44	34.898	24						

HORIZON; July 29, 1962; 1245, 0908, 1127 GCT; 33°38'N, 9°45'W; sounding, 2369 fm; wind, missing; weather, missing; sea, missing; wire angle, 17°, 00°, 00°. 27

0	22.1	36.522	262	0	22.1	36.52	25.36	262	0.00
10	22.06	36.518	261	10	22.06	36.52	25.37	261	0.03
48	18.84	36.435	185	20	21.12	36.50	25.62	238	0.05
96	16.64	36.347	140	30	20.23	36.47	25.84	217	0.07
192	14.66	36.019	121	50	18.70	36.43	26.21	182	0.11
386	12.38	35.707	99	75	17.43	36.39	26.49	155	0.16
582	10.90	35.567	83	100	(16.53)	(36.33)	(26.66)	(139)	(0.19)
778	9.90	35.564	66	125	(15.88)	(36.22)	(26.73)	(132)	(0.23)
977	9.34	35.679	49	150	(15.37)	(36.14)	(26.78)	(127)	(0.26)
				200	(14.56)	(36.00)	(26.86)	(120)	(0.33)
1170	9.02	35.785	36	250	(13.85)	(35.90)	(26.93)	(113)	(0.39)
1565	6.62	35.494	23	300	(13.25)	(35.82)	(26.99)	(107)	(0.45)
1961	4.53	35.170	23	400	12.25	35.70	27.10	97	(0.56)
2406	3.32	-		500	11.47	35.61	27.18	89	(0.66)
				600	10.77	35.57	27.28	80	(0.76)
2805	2.98	34.967	23	700	10.20	35.57	27.38	71	(0.85)
3255	2.65	34.937	23	800	9.82	35.57	27.45	64	(0.94)
3755	2.48	34.909	23	1000	9.30	35.70	27.64	46	(1.09)
4255	2.42	34.899	24	1200	8.92	35.78	27.76	35	(1.21)
				1500	7.05	35.56	27.87	24	(1.37)
				2000	4.39	35.15	27.88	23	(1.60)
				2500	3.23	35.00	27.88	23	(1.82)
				3000	2.82	34.95	27.88	23	(2.03)
				4000	2.45	34.91	27.88	23	(2.46)

SIO
ZEPHYRUS

OBSERVED			COMP	INTERPOLATED			COMPUTED		
Z m	T °C	S ‰	δ_T cl/ton	Z m	T °C	S ‰	σ_t g/L	δ_T cl/ton	ΔD dyn m

28 HORIZON; July 30, 1962; 0452 GCT; 34°47'N, 7°42'W; sounding, 1148 fm; wind, 320°, force 4; weather, partly cloudy; sea, rough; wire angle, 05°.

0	23.1	36.563	286	0	23.1	36.56	25.11	287	0.00
10	23.12	36.542	288	10	23.12	36.54	25.09	289	0.03
99	16.19	36.291	134	20	(23.10)	(36.54)	(25.09)	(288)	(0.06)
197	14.16	35.936	117	30	(19.10)	(36.40)	(26.08)	(194)	(0.08)
295	13.01	35.801	104	50	(17.80)	(36.36)	(26.38)	(165)	(0.12)
392	12.20	35.691	97	75	(16.78)	(36.32)	(26.60)	(145)	(0.16)
490	11.57	35.623	90	100	(16.17)	(36.29)	(26.72)	(133)	(0.19)
589	10.98	35.590	82	125	(15.82)	(36.24)	(26.76)	(129)	(0.23)
688	10.79	35.712	70	150	(15.23)	(36.13)	(26.81)	(125)	(0.26)
786	10.40	35.741	61	200	14.12	35.93	26.90	116	(0.32)
885	9.94	35.761	52	250	13.49	35.86	26.98	109	(0.38)
994	10.14	35.915	44	300	12.97	35.80	27.04	103	(0.44)
1102	10.12	36.011	37	400	12.14	35.68	27.11	96	(0.55)
1211	9.78	36.010	31	500	11.50	35.62	27.18	89	(0.65)
1321	8.96	35.889	27	600	10.93	35.60	27.27	81	(0.75)
1430	8.03	35.729	25	700	10.74	35.72	27.40	69	(0.84)
1539	7.30	-		800	10.32	35.74	27.49	60	(0.92)
1648	6.59	35.499	22	1000	10.14	35.92	27.66	44	(1.07)
1756	5.76	35.369	22	1200	9.83	36.01	27.79	32	(1.19)
1865	5.04	35.282	20	1500	7.57	35.65	27.87	24	(1.36)
1975	4.66	35.201	22	2000	(4.60)	(35.19)	(27.89)	(22)	(1.59)

29 HORIZON; August 1, 1962; 1357 GCT; 36°00'N, 5°18.5'W; sounding, 488 fm; wind, 070°, force 4; weather, hazy; sea, slight; wire angle, 08°.

0	19.04	36.264	202	0	19.04	36.26	25.99	202	0.00
10	16.67	36.230	149	10	16.67	36.23	26.55	149	0.02
30	16.20	36.212	140	20	16.37	36.22	26.62	143	0.03
40	15.98	36.191	137	30	16.20	36.21	26.65	140	0.05
54	14.37	36.171	104	50	15.50	36.19	26.79	126	0.07
74	13.82	36.905	39	75	13.81	36.96	27.76	35	0.09
98	13.70	37.466	-4	100	13.70	37.48	28.18	-5	0.10
146	13.56	37.821	-33	125	13.62	37.66	28.34	-20	0.10
194	13.16	38.215	-70	150	13.54	37.85	28.50	-36	0.09
243	13.07	38.317	-79	200	13.12	38.23	28.89	-72	0.07
316	13.08	38.366	-83	250	13.07	38.33	28.98	-80	0.03
389	13.01	38.403	-87	300	13.08	38.36	29.00	-82	-0.01
463	13.00	38.442	-90	400	13.01	38.41	29.05	-87	-0.08
537	12.98	38.428	-89	500	12.99	38.43	29.07	-89	-0.15
610	12.93	38.420	-90	600	12.94	38.42	29.07	-89	-0.23
684	12.90	-		700	12.90	38.41	29.07	-89	-0.30
759	12.91	38.410	-89	800	12.89	38.41	29.07	-90	-0.36
833	12.88	38.404	-89						

OBSERVED			COMP	INTERPOLATED			COMPUTED		
Z m	T °C	S ‰	δ_T cl/ton	Z m	T °C	S ‰	σ_t g/L	δ_T cl/ton	ΔD dyn m

HORIZON; August 3, 1962; 1543, 1342 GCT; 38°00.5'N, 2°55'E; sounding, 1529 fm; wind, 300°, force 4; weather, hazy; sea, slight; wire angle, 02°, 03°.

0	26.9	36.921	371	0	26.9	36.92	24.22	371	0.00
10	25.28	36.923	323	10	25.28	36.92	24.73	323	0.03
20	21.01	36.811	212	20	21.01	36.81	25.89	212	0.06
30	18.18	37.084	122	30	18.18	37.08	26.84	122	0.08
40	16.38	37.407	57	50	15.46	37.61	27.90	22	0.09
50	15.46	37.613	22	75	13.84	37.79	28.39	-25	0.09
65	14.20a)	37.729	-14	100	13.45	37.91	28.57	-42	0.09
85	13.64	37.853	-34	125	13.23	38.01	28.69	-54	0.07
105	13.39	37.937	-45	150	13.19	38.12	28.79	-63	0.06
125	13.23	38.012	-54	200	13.19	38.32	28.94	-77	0.03
155	13.18	38.142	-64	250	13.19	38.40	29.00	-83	-0.01
189	13.19	38.290	-75	300	13.21	38.44	29.03	-86	-0.05
224	13.18	38.357	-80	400	13.20	38.48	29.06	-89	-0.12
274	13.20	38.419	-84	500	13.17	38.48	29.07	-89	-0.20
323	13.22	38.461	-87	600	13.08	38.46	29.07	-90	-0.27
373	13.21	38.475	-88	700	13.04	38.44	29.07	-89	-0.34
423	13.20	-		800	13.00	38.44	29.08	-90	-0.41
498	13.17	38.479	-89	1000	12.97	38.42	29.07	-89	-0.53
648	13.06	38.455	-90	1200	12.92	38.40	29.06	-88	-0.64
				1500	12.93	38.40	29.06	-88	-0.79
568b)	13.10	38.459	-89	2000	13.00	38.40	29.04	-87	-0.97
769	13.01	38.442	-90	2500	13.08	38.40	29.03	-85	-1.07
969	12.98	38.423	-89						
1169	12.92	38.404	-89						
1368	12.92	38.403	-89						
1567	12.93	38.399	-88						
1766	12.97	38.398	-87						
1966	12.98	-							
2165	13.05	38.400	-86						
2366	13.06	38.394	-85						
2566	13.08	38.397	-85						
2767	13.11	38.397	-84						

a) Alternate value, 14.51°C, not used in interpolation.
b) Overlapping casts; reconciliation of property curves when necessary.

SIO ZEPHYRUS	OBSERVED			COMP	INTERPOLATED			COMPUTED		
	Z m	T °C	S ‰	δ_T cl/ton	Z m	T °C	S ‰	σ_t g/L	δ_T cl/ton	ΔD dyn m

32 HORIZON; August 4, 1962; 2045, 1456, 1626 GCT; 40°39'N, 5°48'E; sounding, 1490 fm; wind, 050°, force 4; weather, hazy; sea, smooth; wire angle, 03°, 00°, 00°.

Z m	T °C	S ‰	δ_T cl/ton	Z m	T °C	S ‰	σ_t g/L	δ_T cl/ton	ΔD dyn m
0	25.5	37.384	296	0	25.5	37.38	25.01	296	0.00
11	24.09	37.382	255	10	24.14	37.38	25.42	257	0.03
20	23.51	37.342	242	20	23.51	37.34	25.58	242	0.05
35	19.69	37.126	156	30	23.00	37.30	25.70	230	0.08
50	16.74	37.607	50	50	16.74	37.61	27.60	50	0.10
65	14.41	37.579	2	75	13.99	37.73	28.32	-18	0.11
80	13.86	37.797	-25	100	13.44	37.90	28.56	-41	0.10
100	13.44	37.902	-42	125	13.24	38.02	28.70	-54	0.09
129	13.22	38.042	-56	150	13.13	38.16	28.83	-67	0.08
159	13.10	38.185	-69	200	13.00	38.28	28.95	-78	0.04
198	13.00	38.275	-78	250	13.10	38.38	29.01	-83	0.01
248	13.10	38.373	-83	300	13.19	38.44	29.04	-86	-0.03
298	13.18	38.441	-86	400	13.27	38.49	29.06	-88	-0.11
347	13.30	38.492	-88	500	13.19	38.49	29.07	-90	-0.18
422	13.25	38.490	-88	600	13.02	38.46	29.09	-91	-0.26
497	13.19	38.488	-89	700	13.00	38.44	29.08	-90	-0.33
646	13.00	-		800	13.00	38.43	29.07	-89	-0.39
796	13.00	38.427	-89	1000	12.93	38.41	29.07	-89	-0.52
997	12.93	38.408	-89	1200	12.91	38.41	29.07	-89	-0.63
				1500	12.92	38.40	29.06	-88	-0.77
1195	12.91	38.407	-89	2000	13.01	38.40	29.04	-87	-0.96
1394	12.90	38.400	-89	2500	13.07	38.42	29.05	-87	-1.06
1595	12.96	38.399	-87						
1795	12.96	-							
1962	13.01	38.398	-86						
2164	13.02	38.397	-86						
2414	13.06	-							
2665	13.09	38.411	-86						

36 HORIZON; August 13, 1962; 1613, 1413 GCT; 39°39.5'N, 10°49'E; sounding, 1552 fm; wind, direction missing, force 1; weather, hazy; sea, smooth; wire angle, 00°, 03°.

Z m	T °C	S ‰	δ_T cl/ton	Z m	T °C	S ‰	σ_t g/L	δ_T cl/ton	ΔD dyn m
0	26.7	38.174	275	0	26.7	38.17	25.22	275	0.00
10	25.30	38.143	235	10	25.30	38.14	25.64	236	0.03
20	-	38.022		20	23.80	38.02	26.01	201	0.05
30	20.24	37.969	109	30	20.24	37.97	26.98	109	0.06
40	17.24	37.764	50	50	16.14	37.94	27.99	13	0.08
50	16.14	37.942	13	75	14.42	38.00	28.43	-29	0.07
65	14.62	37.969	-22	100	14.14	38.13	28.59	-44	0.07
80	14.34	38.040	-33	125	13.92	38.18	28.68	-52	0.05
100	14.14	38.126	-44	150	13.77	38.28	28.79	-63	0.04
125	13.92	38.180	-52	200	13.82	38.44	28.90	-73	0.01
149	13.77	38.272	-62	250	13.84	38.52	28.96	-79	-0.02
199	13.82	38.432	-73	300	13.81	38.56	29.00	-82	-0.06
248	13.84	38.513	-78	400	13.92	38.64	29.03	-86	-0.13
297	13.81	38.558	-82	500	13.83	38.64	29.05	-88	-0.20
347	13.92	38.622	-85	600	13.84	38.64	29.05	-88	-0.28
421	13.92	38.647	-86	700	13.72	38.62	29.06	-88	-0.34
496	13.83	-		800	13.61	38.60	29.07	-89	-0.41
596	13.84	38.645	-88	1000	13.40	38.54	29.07	-89	-0.53
695	13.72	38.623	-89	1200	13.34	38.51	29.06	-88	-0.64
				1500	13.24	38.48	29.06	-88	-0.78
833	13.58	38.587	-89	2000	13.21	38.45	29.04	-86	-0.96
983	13.40	38.540	-89	2500	13.20	38.42	29.02	-84	-1.06
1132	13.40	38.531	-88						
1330	13.26	38.489	-88						
1581	13.24	38.478	-88						
1830	13.24	38.467	-87						
2078	13.20	-							
2328	13.22	38.432	-85						
2577	13.20	38.416	-84						
2828	13.21	38.410	-83						

OBSERVED			COMP	INTERPOLATED			COMPUTED		
Z m	T °C	S ‰	δ_T cl/ton	Z m	T °C	S ‰	σ_t g/L	δ_T cl/ton	ΔD dyn m

HORIZON; September 2-1, 1962; 0555, 2218 GCT; 36°05'N, 18°30.5'E; sounding, 2229 fm; wind, calm; weather, clear; sea, slight; wire angle, 01°, 06°. 52

0	27.7	38.518	281	0	27.7	38.52	25.16	281	0.00
10	27.68	38.500	282	10	27.68	38.50	25.16	282	0.03
20	26.76	38.833	230	20	26.76	38.83	25.70	230	0.05
30	21.16	38.350	105	30	21.16	38.35	27.02	105	0.07
40	19.46	38.364	60	50	18.68	38.56	27.84	27	0.08
55	18.40	38.657	12	75	17.59	38.82	28.32	-18	0.09
70	17.80	38.805	-12	100	16.73	38.83	28.54	-39	0.08
85	17.19	38.821	-28	125	16.16	38.83	28.67	-52	0.07
100	16.73	38.833	-39	150	15.87	38.83	28.74	-58	0.06
149	15.88	38.827	-58	200	15.71	38.84	28.79	-62	0.03
199	15.71	38.841	-62	250	15.54	38.86	28.84	-68	0.00
249	15.54	38.859	-68	300	15.38	38.91	28.92	-75	-0.03
323	15.28	38.921	-78	400	14.77	38.87	29.02	-85	-0.10
398	14.78	38.875	-85	500	14.40	38.83	29.08	-90	-0.17
499	14.40	-		600	14.20	38.81	29.11	-93	-0.24
648	14.13	38.799	-93	700	14.05	38.79	29.12	-94	-0.32
798	13.94	38.774	-95	800	13.93	38.77	29.13	-95	-0.39
				1000	13.81	38.72	29.12	-94	-0.52
988	13.82	38.726	-94	1200	13.73	38.71	29.13	-95	-0.64
1334	13.70	38.695	-94	1500	13.70	38.69	29.12	-94	-0.80
1680	13.69	38.682	-94	2000	13.68	38.67	29.11	-93	-1.00
2027	13.68	38.665	-93	2500	13.67	38.65	29.10	-92	-1.12
2373	13.64	38.649	-92	3000	13.72	38.64	29.08	-90	-1.17
2718	13.70	38.642	-90						
3065	13.72	-							
3411	13.79	38.642	-89						
3756	13.84	38.641	-88						

HORIZON; September 4, 1962; 1335, 1000 GCT; 33°11.5'N 28°39'E; sounding, 1650 fm; wind, 340°, force 4; weather, clear; sea, very rough; wire angle, 17°, 10°. 54

0	25.9	39.105	184	0	25.9	39.10	26.18	184	0.00
10	25.10	39.105	160	10	25.10	39.10	26.43	161	0.02
38	24.61	39.113	145	20	24.80	39.10	26.52	152	0.03
47	20.60	38.569	75	30	24.80	39.11	26.53	151	0.05
57	19.50	38.591	45	50	20.13	38.57	27.47	62	0.07
61	19.15	38.645	32	75	18.25	38.67	28.04	9	0.08
66	18.86	38.646	25	100	17.26	38.78	28.37	-23	0.08
80	17.94	38.700	-1	125	16.77	38.84	28.53	-39	0.07
93	17.48	38.758	-16	150	16.54	38.88	28.62	-47	0.06
137	16.64	38.861	-43	200	16.14	38.94	28.76	-60	0.04
181	16.32	38.918	-54	250	15.64	38.98	28.91	-74	0.01
226	15.86	38.965	-68	300	15.23	38.97	29.00	-82	-0.03
270	15.48	38.978	-78	400	14.57	38.90	29.09	-91	-0.10
316	15.12	38.965	-84	500	14.18	38.82	29.12	-94	-0.18
383	14.67	38.913	-90	600	13.92	38.77	29.14	-95	-0.25
451	14.34	-		700	13.83	38.74	29.13	-95	-0.33
588	13.95	38.770	-95	800	13.74	38.72	29.14	-95	-0.40
				1000	13.65	38.69	29.13	-95	-0.53
836	13.72	38.711	-95	1200	13.64	38.68	29.13	-94	-0.66
1033	13.64	38.688	-95	1500	13.62	38.67	29.12	-94	-0.81
1279	13.64	38.676	-94	2000	13.64	38.66	29.11	-93	-1.01
1526	13.62	38.669	-94	2500	13.70	38.66	29.10	-92	-1.14
1773	13.62	38.665	-94	3000	13.81	38.66	29.07	-90	-1.19
2021	13.65	38.660	-93						
2271	13.68	-							
2519	13.70	38.657	-92						
2768	13.77	38.656	-90						
3017	13.82	38.660	-89						

SIO

ZEPHYRUS

	OBSERVED			COMP	INTERPOLATED			COMPUTED		
	Z m	T °C	S ‰	δ_T cl/ton	Z m	T °C	S ‰	σ_t g/L	δ_T cl/ton	ΔD dyn m

55 HORIZON; September 9, 1962; 1131 GCT; 29°29'N, 32°32'E; sounding, 34 fm; wind, 360°, force 3; weather, clear; sea, slight; wire angle, 07°.

Z m	T °C	S ‰	δ_T cl/ton	Z m	T °C	S ‰	σ_t g/L	δ_T cl/ton	ΔD dyn m
0	26.88	42.456	-27	0	26.88	42.46	28.41	-27	0.00
10	26.58	42.451	-36	10	26.58	42.45	28.50	-36	-0.00
35	26.26	42.435	-44	20	26.36	42.44	28.57	-42	-0.01
60	22.29	42.076	-133	30	26.27	42.44	28.59	-44	-0.01
				50	23.22	42.12	29.30	-111	-0.03

56 HORIZON; September 9, 1962; 1514 GCT; 28°55'N, 32°53.5'E; sounding, 35 fm; wind, 350°, force 5; weather, clear; sea, moderate; wire angle, 08°.

Z m	T °C	S ‰	δ_T cl/ton	Z m	T °C	S ‰	σ_t g/L	δ_T cl/ton	ΔD dyn m
0	25.94	42.119	-31	0	25.94	42.12	28.46	-31	0.00
10	26.08u	42.120		10	25.93	42.12	28.46	-32	-0.00
38	25.88	42.111	-32	20	25.91	42.12	28.47	-32	-0.01
63	22.08	42.013	-135	30	25.89	42.11	28.47	-32	-0.01
				50	25.84	42.11	28.48	-34	-0.02

57 HORIZON; September 9, 1962; 2228 GCT; 27°59'N, 33°32'E; sounding, 42 fm; wind, 310°, force 6; weather, clear; sea, moderate; wire angle, 10°.

Z m	T °C	S ‰	δ_T cl/ton	Z m	T °C	S ‰	σ_t g/L	δ_T cl/ton	ΔD dyn m
0	26.61	41.094	63	0	26.61	41.09	27.46	63	0.00
10	26.62	41.093	63	10	26.62	41.09	27.46	63	0.01
44	26.54	41.318	44	20	26.61	41.13	27.49	60	0.01
73	26.50	41.423	36	30	26.58	41.22	27.57	53	0.02
				50	26.52	41.35	27.69	42	0.03
				75	(26.49)	(41.43)	(27.76)	(35)	(0.04)

58 HORIZON; September 9, 1962; 0017 GCT; 27°46'N, 33°46.5'E; sounding, 40 fm; wind, 310°, force 6; weather, clear; sea, moderate; wire angle, 13°.

Z m	T °C	S ‰	δ_T cl/ton	Z m	T °C	S ‰	σ_t g/L	δ_T cl/ton	ΔD dyn m
0	26.68	40.706	93	0	26.68	40.71	27.15	92	0.00
10	26.72	40.717	93	10	26.72	40.72	27.15	93	0.01
41	25.92	40.750	66	20	26.72	40.72	27.15	93	0.02
70	26.56	41.180	55	30	26.71	40.72	27.15	93	0.03
				50	25.95	40.87	27.51	59	0.04

59 HORIZON; September 10, 1962; 0944 GCT; 28°32.5'N, 34°38.5'E; sounding, 644 fm; wind, 010°, force 6; weather, clear; sea, rough; wire angle, 04°.

Z m	T °C	S ‰	δ_T cl/ton	Z m	T °C	S ‰	σ_t g/L	δ_T cl/ton	ΔD dyn m
0	26.8	40.684	98	0	26.8	40.68	27.09	98	0.00
10	26.85	40.666	101	10	26.85	40.67	27.07	100	0.01
40	26.80	40.670	99	20	26.84	40.67	27.07	100	0.02
50	26.72	40.674	96	30	26.83	40.67	27.07	100	0.03
60	26.37	40.628	89	50	26.72	40.67	27.11	96	0.05
70	26.06	40.619	80	75	24.93	40.53	27.57	53	0.07
85	24.11	40.532	29	100	23.44	40.53	28.02	10	0.08
99	23.49	40.533	11	125	23.00	40.58	28.19	-6	0.08
149	22.12	40.601	-32	150	22.10	40.60	28.47	-32	0.08
198	21.57	40.684	-53	200	21.54	40.69	28.70	-54	0.06
248	21.38	40.721	-60	250	21.38	40.72	28.76	-60	0.04
298	21.38	40.734	-61	300	21.38	40.73	28.77	-61	0.01
348	21.36	40.735	-62	400	21.33	40.74	28.79	-63	-0.04
447	21.30	40.737	-64	500	21.24	40.74	28.82	-65	-0.08
573	21.14	40.750	-69	600	21.14	40.75	28.85	-69	-0.12
698	21.15	40.761	-69	700	21.15	40.75	28.85	-69	-0.17
848	21.13	-		800	21.13	40.76	28.86	-70	-0.20
998	21.15	40.775	-70	1000	21.15	40.77	28.87	-70	-0.27
1173	21.19	40.772	-69						

HORIZON; September 10, 1962; 1626 GCT; 27°32.5'N, 34°13'E; sounding, 704 fm; wind, 330°, force 5; weather, clear; sea, rough; wire angle, 06°. 60

OBSERVED			COMP	INTERPOLATED			COMPUTED		
Z m	T °C	S ‰	δ_T cl/ton	Z m	T °C	S ‰	σ_t g/L	δ_T cl/ton	ΔD dyn m
0	28.7	40.353	181	0	28.7	40.35	26.21	181	0.00
10	28.82	40.346	186	10	28.82	40.35	26.17	185	0.02
20	28.55	40.332	178	20	28.55	40.33	26.25	178	0.04
30	26.38	40.207	119	30	26.38	40.21	26.87	119	0.05
45	25.62	40.273	92	50	25.28	40.29	27.28	80	0.07
65	24.18	40.324	46	75	23.45	40.36	27.89	23	0.09
90	22.92	40.400	5	100	22.74	40.42	28.14	-2	0.09
119	22.52	40.440	-9	125	22.47	40.44	28.24	-11	0.09
148	22.26	40.452	-17	150	22.24	40.45	28.31	-18	0.09
197	21.94	40.489	-29	200	21.92	40.49	28.43	-29	0.08
246	21.79	40.516	-35	250	21.79	40.52	28.49	-35	0.07
295	21.76	40.541	-37	300	21.76	40.54	28.52	-37	0.06
344	21.75	40.554	-38	400	21.74	40.57	28.55	-40	0.03
442	21.74	40.582	-41	500	21.70	40.59	28.57	-42	0.01
566	21.66	40.592	-43	600	21.67	40.59	28.58	-43	-0.01
690	21.70	40.592	-42	700	21.70	40.59	28.57	-42	-0.02
838	21.71	-		800	21.71	40.59	28.57	-42	-0.03
986	21.76	40.608	-42	1000	21.76	40.61	28.57	-42	-0.04
1262	21.74	40.607	-42	1200	21.74	40.61	28.58	-43	-0.04

HORIZON; September 11, 1962; 1810, 1935 GCT; 25°23'N, 36°10'E; sounding, 1225 fm; wind, 340°, force 4; weather, clear; sea, rough; wire angle, 21°, 22°. 61

OBSERVED			COMP	INTERPOLATED			COMPUTED		
Z m	T °C	S ‰	δ_T cl/ton	Z m	T °C	S ‰	σ_t g/L	δ_T cl/ton	ΔD dyn m
0	30.9	39.928	284	0	30.9	39.93	25.14	284	0.00
10	30.84	39.920	282	10	30.84	39.92	25.15	282	0.03
24	30.60	40.118	260	20	30.82	39.94	25.17	280	0.06
37	28.24	40.160	180	30	29.50	40.14	25.78	222	0.08
56	26.58	40.131	131	50	26.93	40.14	26.64	141	0.12
74	24.74	40.300	64	75	24.64	40.30	27.48	61	0.14
93	23.68	40.269	36	100	23.45	40.28	27.83	28	0.16
138	22.57	40.398	-5	125	22.82	40.36	28.07	5	0.16
183	22.04	40.471	-25	150	22.38	40.43	28.26	-12	0.16
228	21.93	40.489	-29	200	22.00	40.48	28.40	-26	0.16
318	21.74	40.543	-38	250	21.89	40.50	28.45	-31	0.15
431	21.70	40.575	-41	300	21.77	40.53	28.51	-36	0.14
568	21.69	40.580	-42	400	21.71	40.57	28.56	-41	0.11
728	21.71	40.590	-42	500	21.70	40.58	28.57	-42	0.09
914	21.70	40.594	-43	600	21.69	40.58	28.57	-42	0.07
1147	21.76	40.600	-41	700	21.71	40.59	28.57	-42	0.06
				800	21.71	40.59	28.57	-42	0.05
1344	21.80	40.603	-41	1000	21.71	40.60	28.58	-43	0.04
1594	21.83	-		1200	21.77	40.60	28.56	-41	0.05
1888	21.94	40.605	-37	1500	21.82	40.60	28.55	-40	0.09
2185	21.98	40.608	-36	2000	21.96	40.60	28.51	-36	0.26

SIO ZEPHYRUS

OBSERVED			COMP	INTERPOLATED			COMPUTED		
Z m	T °C	S ‰	δ_T cl/ton	Z m	T °C	S ‰	σ_t g/L	δ_T cl/ton	ΔD dyn m

62 HORIZON; September 12, 1962; 1959 GCT; 24°02.5'N, 36°41'E; sounding, 630 fm; wind, 320°, force 5; weather, clear; sea, rough; wire angle, 12°.

Z m	T °C	S ‰	δ_T cl/ton	Z m	T °C	S ‰	σ_t g/L	δ_T cl/ton	ΔD dyn m
0	30.6	39.888	277	0	30.6	39.89	25.21	276	0.00
10	30.67	39.879	280	10	30.67	39.88	25.18	280	0.03
20	28.42	40.409	168	20	28.42	40.41	26.35	168	0.05
30	28.11	40.441	156	30	28.11	40.44	26.48	156	0.07
39	27.84	40.428	149	50	26.60	40.33	26.89	117	0.09
54	26.06	40.269	105	75	24.10	40.16	27.54	55	0.12
73	24.24	40.146	60	100	23.50	40.29	27.82	29	0.13
97	23.54	40.288	30	125	23.18	40.31	27.93	19	0.14
146	22.89	40.341	8	150	22.85	40.35	28.06	6	0.14
196	22.14	40.460	-21	200	22.12	40.47	28.36	-22	0.14
246	21.91	40.492	-30	250	21.90	40.50	28.45	-30	0.13
295	21.80	40.523	-35	300	21.80	40.53	28.50	-35	0.12
345	21.76	40.552	-38	400	21.73	40.56	28.54	-39	0.10
445	21.71	40.570	-41	500	21.68	40.58	28.57	-42	0.08
570	21.65	40.584	-43	600	21.66	40.59	28.58	-43	0.06
696	21.69	40.60	-43	700	21.69	40.59	28.58	-43	0.04
847	21.68	-		800	21.68	40.59	28.58	-43	0.03
1000	21.76	40.596	-41	1000	21.76	40.60	28.56	-41	0.02
1101	21.75	40.598	-42						

63 HORIZON; September 13, 1962; 1306 GCT; 22°14.5'N, 37°41.5'E; sounding, 480 fm; wind, 320°, force 5; weather, clear; sea, rough; wire angle, 17°.

Z m	T °C	S ‰	δ_T cl/ton	Z m	T °C	S ‰	σ_t g/L	δ_T cl/ton	ΔD dyn m
0	31.4	39.398	339	0	31.4	39.39	24.55	339	0.00
10	31.34	39.360	339	10	31.34	39.36	24.55	339	0.03
19	31.22	39.347	336	20	30.80	39.35	24.74	322	0.07
29	28.94	39.359	260	30	28.80	39.36	25.43	256	0.10
38	26.84	39.251	202	50	25.64	39.63	26.66	139	0.14
48	25.87	39.599	148	75	23.98	40.06	27.50	59	0.16
62	24.54	39.820	93	100	23.33	40.25	27.84	27	0.17
76	23.98	40.064	59	125	22.63	40.39	28.15	-3	0.18
95	23.37	40.230	30	150	22.23	40.45	28.31	-18	0.18
119	22.78	40.376	3	200	21.90	40.50	28.45	-30	0.17
152	22.20	40.457	-19	250	21.79	40.54	28.51	-36	0.16
189	21.93	40.494	-29	300	21.72	40.56	28.54	-40	0.14
235	21.81	40.532	-35	400	21.68	40.57	28.56	-41	0.12
282	21.76	40.550	-38	500	21.67	40.58	28.57	-42	0.09
329	21.68	40.564	-41	600	21.68	40.59	28.58	-43	0.08
423	21.68	40.571	-41	700	21.70	40.59	28.57	-42	0.06
542	21.65	-		800	21.70	40.60	28.58	-43	0.05
660	21.70	40.593	-42						
806	21.70	40.598	-43						

OBSERVED			COMP	INTERPOLATED			COMPUTED		
Z m	T °C	S ‰	δ_T cl/ton	Z m	T °C	S ‰	σ_t g/L	δ_T cl/ton	ΔD dyn m

HORIZON; September 14, 1962; 1214 GCT; 20°41'N, 38°13'E; sounding, 1100 fm; wind, 340°, force 3; weather, cloudy; sea, moderate; wire angle, 08°. 64

0	31.3	39.338	340	0	31.3	39.34	24.55	339	0.00
10	31.22	39.319	338	10	31.22	39.32	24.56	338	0.03
25	-	39.349		20	31.22	39.33	24.57	337	0.07
35	30.74	39.693	295	30	31.20	39.41	24.64	331	0.10
45	30.17	39.697	276	50	30.08	39.69	25.24	274	0.16
60	29.02a)	39.651	242	75	26.18	39.65	26.51	153	0.22
79	26.08	39.654	150	100	24.10	39.97	27.40	69	0.24
99	24.22	39.931	75	125	23.02	40.26	27.94	18	0.26
148	22.52	40.405	-7	150	22.49	40.42	28.22	-9	0.26
198	22.02	40.51	-28	200	22.01	40.51	28.42	-28	0.25
247	21.82	40.537	-35	250	21.81	40.54	28.50	-36	0.24
322	21.74	40.557	-39	300	21.77	40.55	28.52	-38	0.23
424	21.70	40.572	-41	400	21.71	40.56	28.55	-40	0.21
598	21.70	40.58	-42	500	21.70	40.57	28.56	-41	0.19
797	21.67	40.591	-43	600	21.70	40.58	28.57	-42	0.17
1044	21.74	40.604	-42	700	21.69	40.58	28.57	-42	0.15
1290	21.77	-		800	21.67	40.59	28.58	-43	0.14
1587	21.89	40.603	-38	1000	21.73	40.60	28.57	-42	0.13
1879	21.93	40.614	-38	1200	21.76	40.60	28.56	-41	0.14
				1500	21.86	40.60	28.54	-39	0.19
				2000	(21.94)	(40.61)	(28.52)	(-37)	(0.36)

HORIZON; September 15, 1962; 1751 GCT; 18°06.5'N, 39°57'E; sounding, 740 fm; wind, 350°, force 4; weather, partly cloudy; sea, moderate; wire angle, 25°.[b] 65

0	31.7	38.496	413	0	31.7	38.50	23.78	413	0.00
9	31.76	38.485	416	10	31.76	38.49	23.75	416	0.04
27	31.63	38.53	409	20	31.74	38.52	23.78	413	0.08
41	30.94	38.461	390	30	31.66	38.52	23.81	410	0.12
55	30.62	38.758	358	50	30.75	38.62	24.20	372	0.20
64	28.25	38.746	282	75	27.60	38.80	25.41	258	0.28
78	26.03	39.142	185	100	23.65	39.80	27.40	69	0.32
92	24.80	39.582	117	125	23.10	40.32	27.96	16	0.34
138	22.58	40.42	-6	150	22.29	40.46	28.30	-17	0.34
184	21.96	40.507	-29	200	21.91	40.52	28.46	-32	0.33
231	21.84	40.528	-34	250	21.80	40.54	28.51	-36	0.32
301	21.73	40.560	-39	300	21.73	40.56	28.54	-39	0.30
396	21.70	40.574	-41	400	21.70	40.57	28.56	-41	0.28
513	21.69	40.583	-42	500	21.69	40.58	28.57	-42	0.26
656	21.66	40.56	-41	600	21.67	40.57	28.57	-42	0.24
799	21.70	40.595	-43	700	21.68	40.59	28.58	-43	0.22
943	21.71	-		800	21.70	40.60	28.58	-43	0.21
1088	21.78	40.597	-41	1000	21.73	40.60	28.57	-42	0.20
1235	21.80	40.598	-40	1200	21.80	40.60	28.55	-40	0.21

a) Mean value of 28.93 and 29.10°C.

b) This is the only station on this cruise where oxygen samples were collected. The observed values are as follows: 9 m, 4.29; 27, 4.23; 41, 4.35; 55, 4.34; 64, 4.19; 78, 3.56; 92, 3.39; 138, 2.41; 184, 0.70; 231, 0.72; 301, 0.54; 396, 0.91; 513, 1.47; 656, 1.83; 799, 2.12; 1088, 2.21; 1235, 2.23 ml/L.

OBSERVED			COMP	INTERPOLATED			COMPUTED		
Z	T	S	δ_T	Z	T	S	σ_t	δ_T	ΔD
m	°C	‰	cl/ton	m	°C	‰	g/L	cl/ton	dyn m

66

HORIZON; September 16, 1962; 2130 GCT; 16°34.5'N, 41°04'E; sounding, 810 fm; wind, 300°, force 3; weather, cloudy; sea, moderate; wire angle, 10°.

0	32.8	38.438	456	0	32.8	38.44	23.33	455	0.00
10	32.68	38.428	452	10	32.68	38.43	23.37	452	0.05
30	32.69	38.423	453	20	32.68	38.43	23.37	452	0.09
44	29.00	37.864	369	30	32.69	38.42	23.36	453	0.14
59	24.54	37.274	276	50	28.00	37.70	24.45	349	0.22
73	22.76	37.773	190	75	22.54	37.80	26.21	182	0.28
88	21.86	38.487	114	100	22.90	39.50	27.40	69	0.32
107	23.34	39.917	51	125	23.00	40.33	28.00	12	0.33
121	23.10	40.288	18	150	22.43	40.45	28.26	-12	0.33
160	22.20	40.457	-19	200	21.90	40.51	28.46	-31	0.32
208	21.88	40.519	-32	250	21.81	40.54	28.50	-36	0.31
265	21.78	40.543	-37	300	21.73	40.56	28.54	-39	0.30
337	21.72	40.564	-40	400	21.71	40.57	28.56	-41	0.27
435	21.71	40.577	-41	500	21.70	40.58	28.57	-42	0.25
582	21.69	40.582	-42	600	(21.69)	(40.59)	(28.58)	(-43)	(0.23)

67

HORIZON; September 17, 1962; 1415 GCT; 15°18.5'N, 41°54'E; sounding, 730 fm; wind, 360°, force 3; weather, partly cloudy; sea, moderate; wire angle, 09°.

0	32.7	37.952	487	0	32.7	37.95	23.00	487	0.00
10	32.74	37.935	490	10	32.74	37.94	22.98	489	0.05
25	29.14	37.465	402	20	32.00	37.86	23.19	469	0.10
45	20.77	36.445	233	30	26.00	37.07	24.62	333	0.14
64	18.17	36.191	186	50	19.70	36.33	25.87	214	0.19
89	18.70	37.071	135	75	17.15	36.35	26.53	151	0.24
99	20.72	38.437	87	100	20.92	38.56	27.24	84	0.27
109	22.44	39.555	52	125	22.78	40.37	28.09	3	0.28
123	22.86	40.344	7	150	22.32	40.44	28.28	-15	0.28
147	22.34	40.433	-14	200	22.06	40.49	28.39	-25	0.27
197	22.07	40.485	-25	250	21.89	40.52	28.47	-32	0.26
246	21.90	40.518	-32	300	21.82	40.54	28.50	-35	0.25
295	21.82	40.536	-35	400	21.73	40.56	28.54	-39	0.23
343	21.78	40.560	-38	500	21.70	40.58	28.57	-42	0.21
441	21.70	40.566	-41	600	21.70	(40.59)	(28.57)	(-42)	(0.19)
563	21.70	40.587	-42	700	21.70	(40.59)	(28.57)	(-42)	(0.18)
686	21.69	-		800	21.73	(40.59)	(28.56)	(-41)	(0.17)
834	21.75	40.585	-41	1000	21.77	40.59	28.55	-40	(0.16)
1033	21.77	40.591	-40						

69

HORIZON; September 18, 1962; 0638 GCT; 12°53.5'N, 43°12'E; sounding, 107 fm; wind, 100°, force 4; weather, partly cloudy; sea, moderate; wire angle, 06°.

0	32.4	37.801	487	0	32.4	37.80	23.00	487	0.00
10	32.32	37.785	486	10	32.32	37.78	23.01	486	0.05
25	32.00	37.692	481	20	32.32	37.76	23.00	488	0.10
35	27.17	37.075	368	30	31.00	37.50	23.27	461	0.14
45	21.90	36.246	277	50	20.25	36.01	25.48	251	0.22
55	19.04	35.848	232	75	17.36	35.73	26.01	201	0.27
65	17.50	35.710	206	100	15.90	35.93	26.50	154	0.32
80	16.92	35.724	191	125	15.68	36.06	26.65	140	0.36
100	15.90	35.933	154	150	17.88	37.36	27.13	95	0.39
119	15.72	36.005	144						
129	15.62	36.100	135						
139	16.25	36.411	126						
149	17.59	37.179	101						
159	19.61	38.540	51						
174	20.68	39.118	37						
189	20.72	-							

OBSERVED			COMP	INTERPOLATED			COMPUTED		
Z m	T °C	S ‰	δ_T cl/ton	Z m	T °C	S ‰	σ_t g/L	δ_T cl/ton	ΔD dyn m

HORIZON; September 18, 1962; 1057 GCT; 12°20'N, 43°38.5'E; sounding, 180 fm; wind, 120°, force 1; weather, partly cloudy; sea, smooth; wire angle, 01°. 70

0	30.1	36.180	526	0	30.1	36.18	22.60	526	0.00
10	25.11	36.256	366	10	25.11	36.26	24.28	365	0.04
20	21.50	35.795	299	20	21.50	35.80	24.98	298	0.08
30	19.04	35.693	244	30	19.04	35.69	25.56	244	0.10
40	18.26	35.675	226	50	17.81	35.66	25.84	217	0.15
50	17.81	35.664	216	75	16.74	35.67	26.11	191	0.20
65	17.28	35.697	202	100	16.03	35.65	26.26	177	0.25
80	16.54	35.659	188	125	15.54	35.65	26.37	166	0.29
110	15.82	35.651	172	150	15.14	35.64	26.45	159	0.34
149	15.16	35.640	159	200	14.62	35.76	26.66	139	0.41
199	14.62	35.750	140	250	15.04	35.96	26.72	133	0.48
249	15.04	35.952	134	300	(15.00)	(36.07)	(26.81)	(124)	(0.55)
298	15.01	36.065	125						

HORIZON; September 18, 1962; 1907, 1929 GCT; 12°04.5'N, 44°23'E; sounding, 788 fm; wind, calm; weather, clear; sea, smooth; wire angle, 04°, 05°. 71

0	30.9	36.177	553	0	30.9	36.18	22.32	552	0.00
10	29.00	36.212	488	10	29.00	36.21	22.99	488	0.05
20	22.11	35.879	309	20	22.11	35.88	24.87	309	0.09
30	20.69	35.803	277	30	20.69	35.80	25.21	277	0.12
				50	16.89	35.60	26.02	200	0.17
40	18.69	35.737	232	75	16.62	35.62	26.10	192	0.22
65	16.71	35.617	195	100	15.62	35.58	26.30	173	0.27
89	15.73	35.571	176	125	15.51	35.60	26.34	169	0.31
118	15.56	35.594	171	150	15.28	35.61	26.40	164	0.35
147	15.31	35.603	165	200	14.75	35.66	26.55	149	0.43
196	14.76	35.655	150	250	14.47	35.72	26.66	139	0.51
245	14.50	35.708	140	300	14.28	35.84	26.79	126	0.58
295	14.30	35.825	128	400	14.14	36.01	26.95	111	0.71
393	14.12	35.988	112	500	14.98	36.46	27.12	95	0.82
493	14.99	36.465	95	600	13.93	36.32	27.24	84	0.93
643	13.41	36.242	79	700	12.90	36.18	27.34	74	1.03
791	12.51	-		800	12.53	36.18	27.42	67	1.12
1043	16.15	37.458	48	1000	15.91	37.37	27.61	49	1.29
1344	15.73	37.326	48	1200	15.98	37.40	27.61	48	1.46

HORIZON; September 21, 1962; 1727, 1545 GCT; 13°16.5'N, 49°15'E; sounding, 1326 fm; wind, 250°, force 4; weather, overcast; sea, moderate; wire angle, 16°, 05°. 74

0	30.4	36.057	545	0	30.4	36.06	22.40	544	0.00
10	27.98	36.060	466	10	27.98	36.06	23.22	466	0.05
19	20.56	35.646	285	20	20.38	35.64	25.17	281	0.09
29	19.72	35.615	266	30	19.58	35.61	25.36	263	0.12
38	18.67	35.597	242	50	17.82	35.62	25.81	220	0.16
62	17.16	35.632	204	75	16.53	35.61	26.11	191	0.22
86	16.00	35.598	180	100	15.47	35.60	26.35	169	0.26
113	15.12	35.611	160	125	14.91	35.61	26.48	156	0.30
141	14.62	35.606	150	150	14.49	35.61	26.57	147	0.34
187	13.96	35.626	135	200	13.86	35.66	26.74	131	0.41
256	13.74	35.783	120	250	13.73	35.76	26.85	121	0.48
350	13.89	35.989	107	300	13.81	35.89	26.93	113	0.54
446	13.76	36.103	97	400	13.91	36.07	27.05	102	0.66
543	12.50	35.910	86	500	13.08	36.01	27.18	90	0.77
665	12.10	35.943	76	600	12.38	35.94	27.26	82	0.87
814	11.06	35.814	67	700	11.88	35.92	27.34	74	0.96
1015	10.28	-		800	11.14	35.82	27.41	68	1.05
1217	7.84	35.420	45	1000	10.34	35.80	27.54	56	1.22
1472	5.59	35.136	37	1200	8.01	35.44	27.64	46	1.37
				1500	5.41	35.11	27.73	37	1.55
1762	4.06	34.952	34	2000	3.18	34.86	27.78	33	1.81
1862	3.64	34.918	33						
1961	3.29	-							
2060	3.06	34.855	32						
2159	2.96	34.845	32						

SIO

ZEPHYRUS

OBSERVED			COMP	INTERPOLATED			COMPUTED		
Z	T	S	δ_T	Z	T	S	σ_t	δ_T	ΔD
m	°C	‰	cl/ton	m	°C	‰	g/L	cl/ton	dyn m

83

HORIZON; September 26, 1962; 1719, 1402 GCT; 9°40'N, 66°19'E; sounding, 2438 fm; wind, 320°, force 3; weather, partly cloudy; sea, moderate; wire angle, 07°, 06°.

0	28.0	36.336	447	0	28.0	36.34	23.42	447	0.00
10	28.06	36.33	450	10	28.06	36.33	23.40	450	0.04
40	27.94	36.331	446	20	27.94	36.33	23.44	446	0.09
60	27.93	36.354	444	30	27.94	36.33	23.44	446	0.13
74	27.08	36.245	425	50	27.93	36.34	23.45	445	0.22
89	26.28	36.180	406	75	27.00	36.24	23.67	423	0.33
113	24.13	36.009	355	100	25.69	36.13	24.00	392	0.44
148	18.94	35.597	248	125	22.02	35.84	24.87	309	0.52
197	14.71	35.292	175	150	18.64	35.58	25.57	242	0.59
271	12.86	35.317	137	200	14.67	35.30	26.29	174	0.70
344	11.58	35.243	118	250	13.37	35.32	26.58	146	0.78
418	11.06	35.260	108	300	12.28	35.29	26.78	128	0.86
517	10.74	35.317	98	400	11.11	35.24	26.96	110	0.98
641	9.76	35.266	86	500	10.84	35.31	27.06	101	1.10
789	8.87	35.251	73	600	10.05	35.28	27.18	90	1.21
989	7.7 a)	35.169	62	700	9.37	35.26	27.28	80	1.31
1188	6.43	-		800	8.81	35.25	27.36	72	1.40
1485	4.66	34.923	43	1000	7.71	35.17	27.47	62	1.57
1832	3.28	34.840	35	1200	6.37	35.06	27.57	52	1.72
				1500	4.60	34.92	27.68	42	1.91
2211	2.44	34.787	32	2000	2.81	34.81	27.77	33	2.17
2705	2.2 a)	34.772	31	2500	2.07	34.77	27.80	31	2.39
3201	1.70	34.742	30	3000	1.76	34.75	27.81	30	2.60
3697	1.70	34.739	30	4000	1.69	34.74	27.81	30	3.03
4193	1.66	34.736	30						

a) Temperature inferred from pressure thermometer and wire depth.

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